COAL AGE

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### A Specific Case

*A SUPERINTENDENT who took charge of a mine a year ago remarked, on his way to the office during one of the first days of his connection with the company, that he did not like the looks of an old engine, a mass of junk lying nearly across his path. "I'll have that removed in short order," he said. But he has postponed the departure of the engine, and it still remains. In fact, it will probably stay where it is until some official higher than himself suddenly bears down on him with a few short, crisp remarks.*

# Procrastination

By M. D. Cooper

**Are you a procrastinator? Are you putting off, for an indefinite future time that may never arrive, something you ought to be doing today?**

### Another Instance

*AT ANOTHER MINE the blower fan is located on a small area of sloping ground. In winter there is real danger of a person slipping and falling against the rotating fan wheel. Everyone in authority at that particular mine is aware of the danger. However, the very ease with which the danger could be eliminated by erecting a short fence made up of a few feet of chain or two or three lengths of old pipe has resulted in the development of a general spirit of procrastination in regard to it. An accident, of course, will recall attention to the surroundings of the fan.*

SUCH cases as that of the fan make one almost ready to believe that some people have twisted the old saying around and actually follow a revised version of their own, which probably is, "Never do today what you might as well do tomorrow."

The difficulty with such a motto is that it sounds sweet and musical today; but generally for its follower tomorrow arrives with a thud, and the contented procrastinator of yesterday finds himself thrown in with the things of yesterday—things the usefulness of which is gone.

On the other hand, there is a mighty comfortable feeling that takes hold of all of us when we know that we are keeping our work up to the top notch; when, because of our careful planning and the fact that things are being done on time, everything goes "dead right." ("Dead right" is rather an uncommon expression, isn't it? We've heard many times of things going "dead wrong," but we need not forget that it is possible to make things go "dead right.")

"Leave it to time," said the ancients. Our sorrows and our ills and our injuries were left for time to heal. But today we are beginning to realize that we must not put off things for the future, waiting for accidents to happen and then applying the cure.

TODAY we must use our brains and our energy to prevent accidents and reduce to a minimum those things that must unavoidably be left to time. What are you doing *now* in your mine, or around your ovens, or in your town?

You doubtless have a force you feel compelled to keep at work during the present dull season. Are you using it to best advantage, or are you procrastinating—killing time? Are the stoppings in your air-courses being tightened up? Are the loose frogs in your haulageways, that you never can touch during busy periods, being repaired? Are you employing most advantageously the men you are compelled to keep on the payroll in fixing up the thousand and one little details you can't stop for when you are running at full capacity?

Or, on the other hand, perhaps you are just waiting. Business is dull, but prosperity will return. There is no need of bothering about much, say some. Yes, surely prosperity will return. But remember its return will inevitably be surer and sooner to those places where best efforts have been put forth for its welcome. The dilatory fellow, who keeps putting things off, will doubtless find out that prosperity, for him, may do a little procrastinating on its own account.

# Plant of the Nokomis Coal Co.

By Warren R. Roberts*

*SYNOPSIS—Severe competition in the coal fields of the Mississippi Valley impels operators to cheapen costs and improve the quality of the mine product by all means possible. The plant here described was designed not only to handle an enormous output but to prepare it in the most thorough manner.*

The severe competitive conditions which exist in the Central Mississippi States have compelled coal operators to resort to every means at their command to secure advantages and thereby markets. In certain districts where the quality of the coal is such as to need less preparation than that from some other locality, producers have given their attention to increasing their tonnages and thereby reducing the cost of production.

One of the mining districts in Illinois where unusually large production has been secured is that including the coal field from Gillespie, southward through Staunton and Livingston, and thence northeast to Nokomis. Within this district are located several of the largest producing mines in the state, as well as some new operations which are being developed for still larger capacities than even the largest mines within the district.

At Gillespie, Ill., there are located three mines of the Superior Coal Co., which have averaged daily productions of about 4000 tons each and often exceed this amount.

The Mount Olive & Staunton Coal Co. has two mines near Staunton, Ill., both of which are large producers. No. 2 is especially interesting in this connection as it has an average daily capacity of about 4000 tons.

At Livingston is located the mine doubtless having the largest average production. This mine is operated by the New Staunton Coal Co., and before the recent business depression, which has undoubtedly somewhat curtailed its output, it often produced approximately 4500 tons per day and several times exceeded this amount.

The above discussion of large tonnages is only recited in order to indicate the requirements when a new mine is opened in this district, which is to equal or exceed the production of some of those already existing.

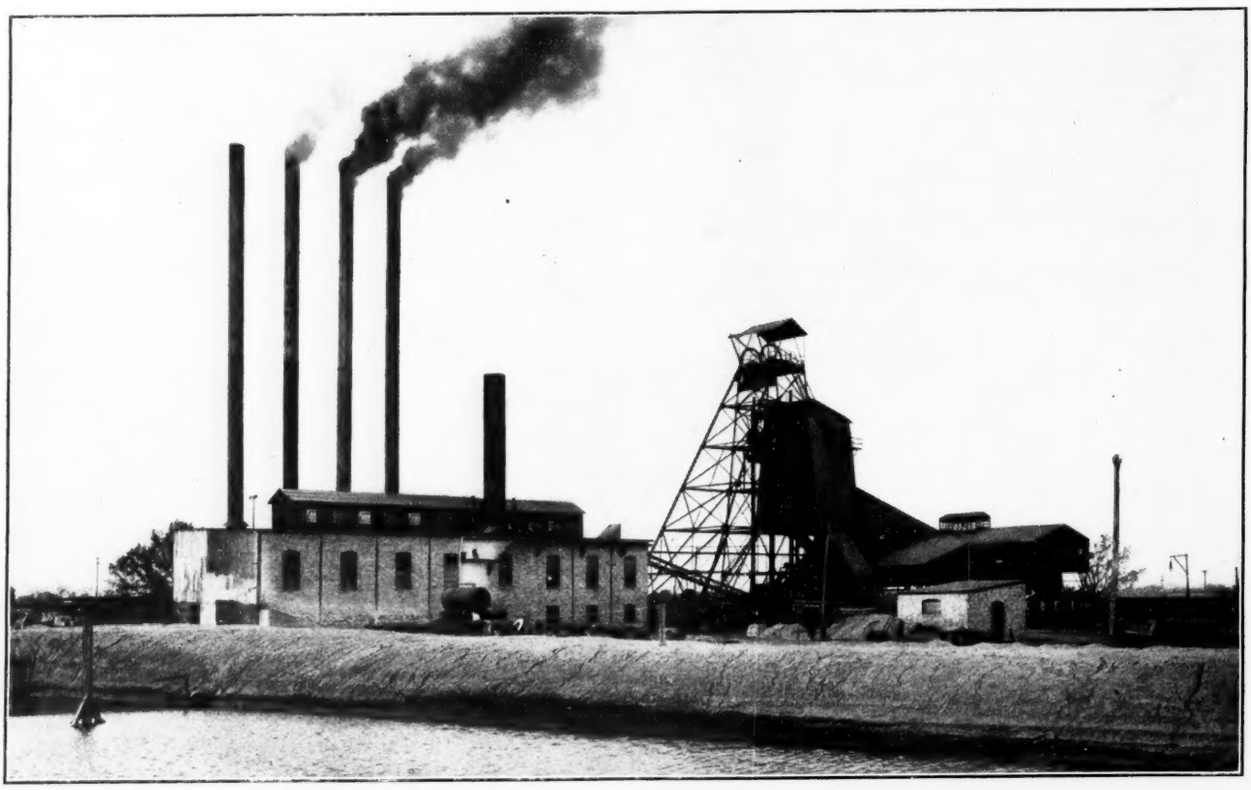


Fig. 1. General View of Tipple and Power House

Some three years ago J. E. Rutledge, of St. Louis, Mo., general manager of the New Staunton Coal Co., organized a new firm and began the development of a valuable tract of coal just south of Nokomis, Ill. It was the desire of Mr. Rutledge and his associates to develop a mine which could easily produce 5000 tons of coal per day. He, therefore, in sinking his shafts, developing his underground layout and building the top works, made all of his plans for this extreme production. The plant which this article describes and illustrates will indicate in a somewhat meager way how well he has accomplished what he set out to do.

*President, Roberts & Schaefer Co., Chicago, Ill.

The top works consist of a large steel four-track tipple; a combined power and boiler plant; a large building including the various shops for blacksmithing, carpentry and general repairing; a complete water system, including a large reservoir; and several lesser buildings.

The illustration in Fig. 1 gives the general view of the plant showing especially the tipple and combined boiler and power house.

Fig. 2 is a closer view of the tipple, taken so as to especially illustrate the sheds adjoining the tipple for housing the loading booms on the lump and egg tracks and including the weigh house for all the railroad track scales.

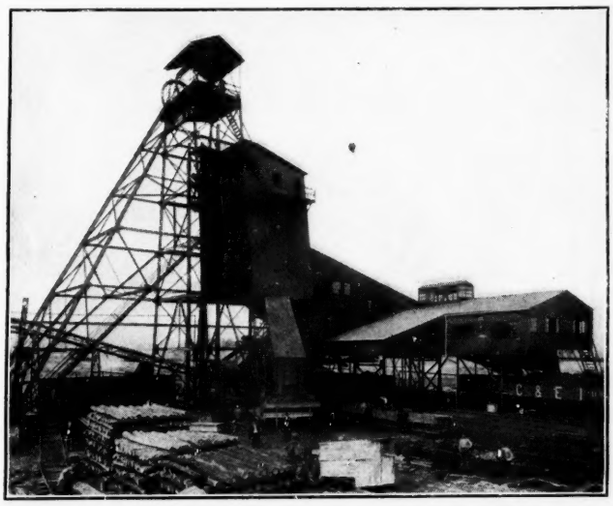


FIG. 2. ANOTHER VIEW OF THE TIPPLE, SHOWING SHEDS OVER LOADING BOOMS

A brief description of the tipple equipment will be of interest not only on account of the magnitude of the screens, weigh hopper, etc., but because of the excellent preparation that is given to the coal by the introduction of the two combined picking tables and loading booms. While picking tables and loading booms have been quite commonly used in some other states, they are a new feature of preparation in Illinois.

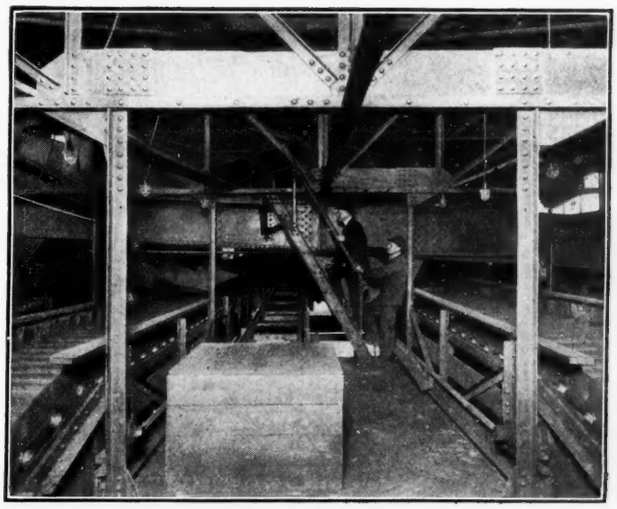


FIG. 5. HORIZONTAL PORTION OF THE LOADING BOOMS

On account of the depth of the shaft, which is about 600 ft., it was necessary to use a large mine car and self-dumping cages to reach the desired capacity of 5000 tons per day. The pit cars, therefore, at this mine are designed to hold about four tons of coal, which being mined on a run-of-mine basis, is dumped directly into the weigh basket, from which it is discharged into a receiving hopper large enough to hold the contents of some two or three pit cars. From this receiving hopper the coal is delivered uniformly by a reciprocating feeder onto the shaking screens. This regularity of the flow of coal onto the screens enables them to take care of a larger tonnage and secure a better preparation than otherwise could be attained.

### LARGE SCREENS ARE EMPLOYED

Fig. 3 is a view of the shakers taken from the lower end and to one side, in order to illustrate the driving equipment for this massive pair of screens, which are 10 ft. wide and about 57 ft. long and are double decked on the rear portion.

Fig. 4 illustrates particularly how the shaking screens deliver coal onto the lump-picking table. Only a portion

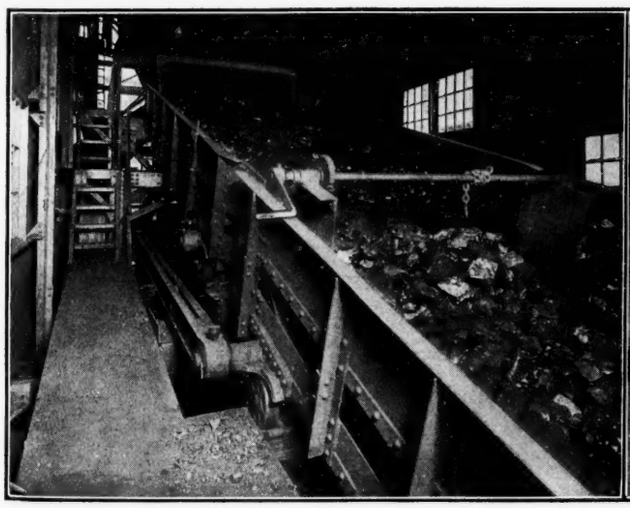


**FIG. 3. VIEW LOOKING UP THE SHAKING SCREENS**

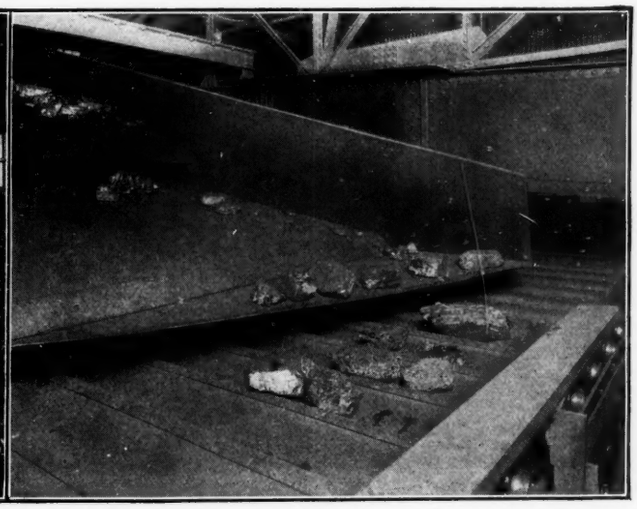


**FIG. 4. THE DELIVERY OF SHAKING SCREENS TO THE PICKING TABLE**

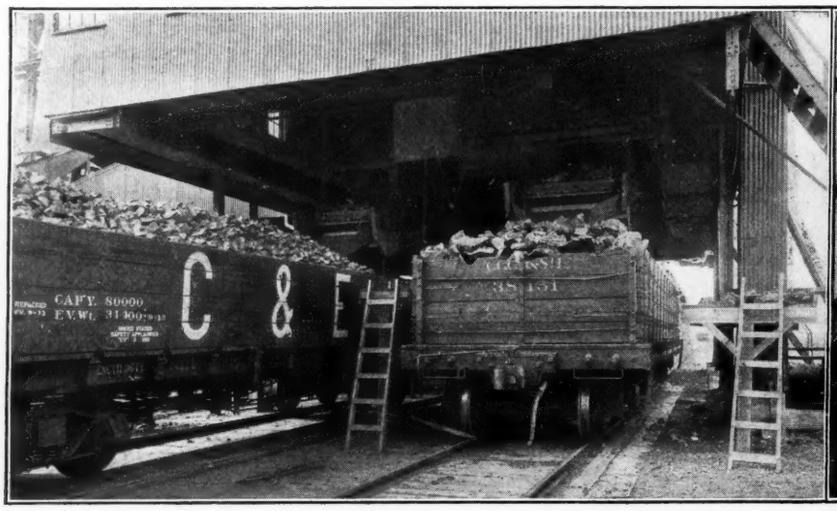



FIG. 6. END VIEW OF LOADING BOOMS

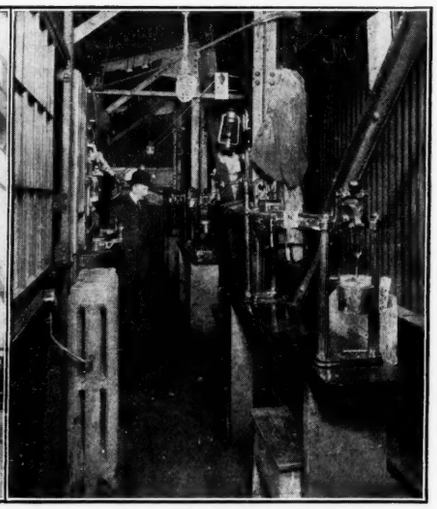


FIG. 7. INTERIOR OF WEIGH HOUSE

of the screen is shown, but enough to indicate that the coal is practically laid onto the picking table.

Fig. 5 illustrates that portion of the booms next to the shaking screens which is placed on the horizontal and is used as a picking table. This view shows readily the facilities for picking both the egg and lump coal.

Fig. 6 gives an end view of both the lump and egg booms, showing how nicely they deliver the coal with the least breakage and at the same time trim the cars without manual labor.

Fig. 7 is an interior view of the weigh house showing the beams of the four 80-ft. railroad track scales, by the use of which not only all the empties, but all the loads are weighed.

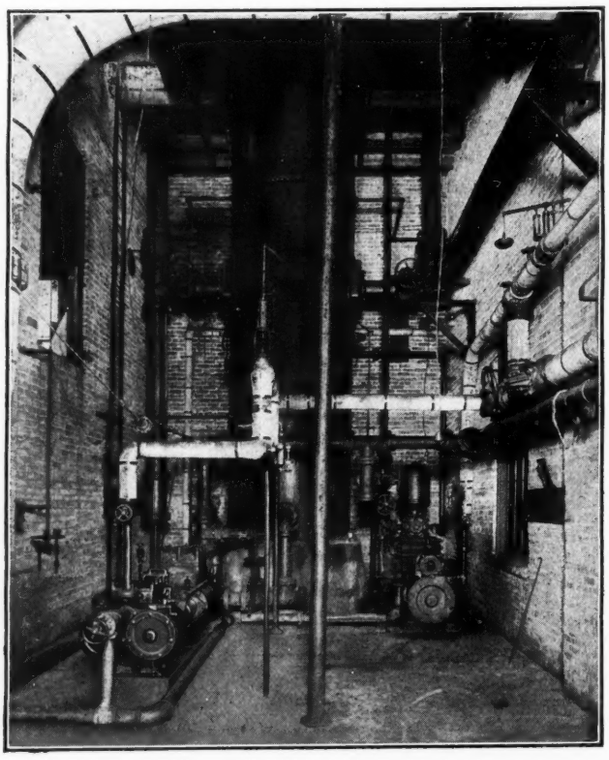


FIG. 8. INTERIOR VIEW OF PUMP ROOM, SHOWING PUMPS AND FEED-WATER HEATER

The engine house contains one of the largest hoists in Illinois, consisting of a pair of 28x48-in. direct-connected engines, operating a double drum 10 ft. in diameter. These are standard engines with all modern safety appliances, and are fully capable of handling the four-ton car of coal, which together with the weight of the self-dumping cage, cable, etc., makes a total load of 14 tons.

Fig. 8 is an interior view of the pump room, which is located between the hoist and the boiler rooms of the power house. This pump room not only contains the boiler feed pumps, but the large vertical heater shown which heats the boiler feed water with the exhaust steam from the hoisting engines.

While this mine is still comparatively young, it has already attained a tonnage of about half its ultimate capacity, and with the present rapid development of the underground work, with the resumption of normal business conditions which would make it advisable to increase the production, it will not be long until the ultimate capacity for which the mine and plant were both designed, namely, 5000 tons in 8 hours, will be reached.

The Roberts & Schaefer Co., engineers and contractors, of Chicago, designed and built this complete plant.

## Who Is the Most Successful Coal-Mining Man You Know?

The SUCCESS number of COAL AGE, Apr. 3, will be devoted to men engaged in mining, as well as to methods and machines used in getting out the coal. You undoubtedly have in mind, or number among your acquaintances, some man engaged in this industry who has created for himself quite a successful career. Perhaps the man you are thinking of has worked in a lowly position without any educational advantages, and in spite of such a handicap has been thrifty enough to purchase a home, raise and educate a family. Or, it may be that the man you have in mind has fought his way to a position of authority in the mining field. Both such men are successes, and nothing is more interesting and inspiring than the true story of how they have overcome difficulties. Pick out your man and prepare a sketch of his life at once. Send it to us immediately, and if possible include a photo of the person you write about.

# Effects of the European War on Our Export Trade--I

By J. S. Burrows*

*SYNOPSIS—The following views of a fuel expert of one of the oldest coal-exporting firms in the country are of particular interest in connection with prospective developments in the foreign trade. Commerce is gradually adapting itself to the new conditions and it is now possible to anticipate with fair accuracy what we may reasonably expect to gain in the world's coal markets.*

It is generally believed that the European conflict is America's opportunity to establish herself in the coal markets of the world and to accomplish, in a short time, what it has taken England and Germany decades to do. There has been much extravagant speculation concerning export business and many statements have been made which are plainly illusory. Among other things it is hoped that we will be able to increase our foreign markets for coal, and it is the purpose of this paper to substitute for mere conjecture a rational basis on which to formulate an estimate of our prospects.

## The World's Coal Supply

We are in a unique position as regards the European conflict and all of the usual economic factors which govern supply and demand have been completely upset. At the same time the war itself has brought about certain new conditions which have now had time to crystallize as governing trade factors for the war period, and it is now possible to arrive at some logical conclusions as to the outlook. As both the supply and demand for coal have been greatly curtailed, the subject will be divided under these two general heads, and the normal and extraordinary conditions now in effect will be reviewed.

TABLE 1. PRINCIPAL COAL-PRODUCING COUNTRIES OF THE WORLD

| Country | Output[1] | Loss[2] | Remarks |
|---|---|---|---|
| Great Britain | 287 | 20% | Production exceeds consumption. Largest exporter of coal |
| France | 40 | 75% | Consumption exceeds production. Imports coal |
| Russia | 30 | ? | Consumption exceeds production. Imports coal |
| Japan | 21 | nil | Production exceeds consumption. Exports coal |
| English allies | 378 | | |
| Germany (coal and lignite) | 275 | Note[3] | Production exceeds consumption. Second largest exporter, and imports some coal |
| Austria | 51 | Note[4] | Consumption exceeds production. Imports coal |
| Belgium | 22 | Prob. 100% | Consumption exceeds production. Imports coal |
| German allies | 348 | | |
| Total, belligerents | 726 | | |
| India | 15½ | 10% | Production exceeds consumption. Exports coal |
| Australia | 12½ | 10% | Production exceeds consumption. Exports coal |
| New Zealand | 2½ | nil | Production exceeds consumption. Exports coal |
| Canada | 13½ | nil | Exchanges coal with U. S. Balance in favor U. S. |
| South Africa | 10 | nil | Imports and exports coal |
| Spain | 3½ | nil | Consumption exceeds production. Imports coal |
| Other countries | 19 | | Mostly importers |
| Total, foreign neutral countries | 76½ | | |
| United States | 509 | nil | Production exceeds consumption. Exports coal |
| World total | 1¾ billion | | |

[1] Normal output based on the returns for 1913. Figures indicate millions of gross tons.
[2] Reduction in output during the war period.
[3] Now German territory.
[4] Reduced to home requirements and those of Austria, Belgium and possibly Holland.

In normal times, the world's coal production and consumption (since coal is mined as needed) are, in round figures, one and one-third billion tons. Table 1 gives a list of the principal countries which contribute the bulk of this vast total. The belligerent nations have been grouped according to their alliances to show the normal productive capacity of each side, and the neutral countries have also been grouped together to show the tonnage which has not been directly affected by the war. It will be seen that nearly 90 per cent. of the world's supply of coal is furnished by the United States, Great Britain, Germany, France, Belgium and Austria, of which the United States' proportion is 40 per cent., while 50 per cent. is mined in the other countries mentioned, all of which are now at war.

These coal-producing countries may be separated into three classes, as follows:

*Class 1*—Those countries which have a productive capacity of all needed varieties of coal in excess of home requirements and are normally exporters of coal.

*Class 2*—Those countries which produce less than their own requirements and must normally import coal to make up the deficiency.

*Class 3*—Those countries which lack certain varieties of coal for special industrial purposes, such as gas making, and which must import these grades.

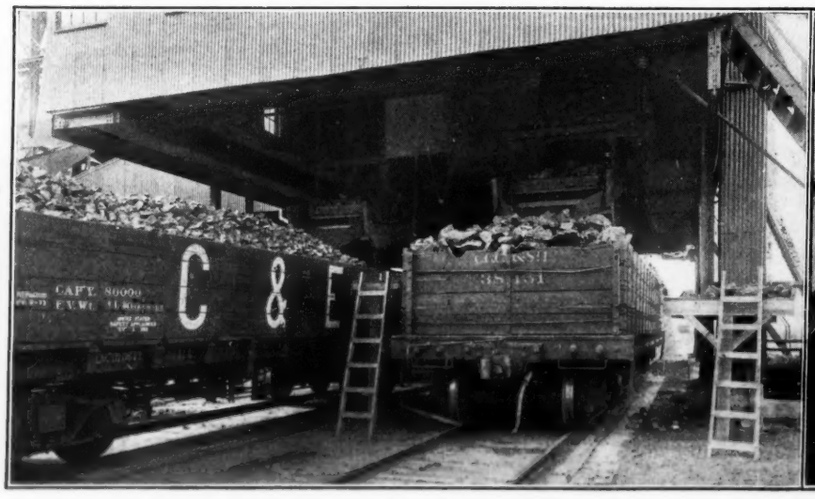
In the first class (those which have an excess production over home needs) are the United States, Great Britain, Germany, Australia and Japan. These countries can provide their own fuel under any conditions, or in other words, are independent of the rest of the world in this respect, and in normal times they have to seek a foreign market as an outlet for their surpluses. Germany, it is true, has always imported some coal from England, but she need not do so, and to offset this, it may be said that quite recently the London gas works purchased a considerable tonnage of German coal.

In the second class (those countries which find it necessary to supplement their home production with imported coals to meet their own requirements) are France, Russia, Austria, Belgium, Spain, and miscellaneous smaller producers.

The third class, embracing countries which find it necessary to import coal for special purposes, includes Canada, South Africa, New Zealand and India. Most of the countries which come within this class, notably Canada, India and South Africa, could, if the necessity arose, take care of themselves. For instance, Canada annually buys over four million tons of anthracite from the United States, which is preferred to the home product for domestic heating purposes, but which could be replaced with her own bituminous coal in the event of her being unable to obtain supplies from us.

From this classification it will be seen that the countries enumerated in class two must depend, to a very great extent, on the countries which are fortunate enough to be-

*Fuel expert, Castner, Curran & Bullitt, Inc., Norfolk, Va.



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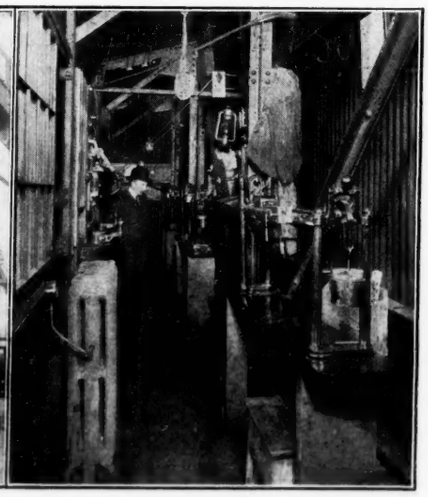

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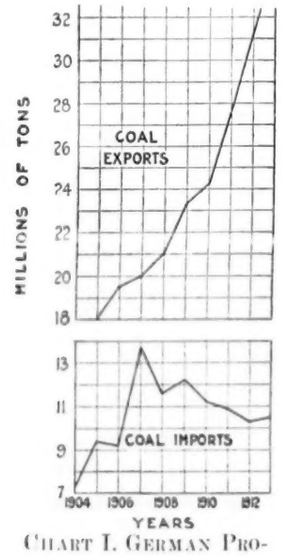


CHART I. GERMAN PRODUCTION, EXPORTS AND IMPORTS

trial coal trade is affected to a far less extent than that of Belgium, her normal production of 50 odd million tons will probably be seriously curtailed through the requisitioning of both men and transportation for military purposes.

*France*—The French output is normally about 40 million tons per annum. An English estimate* places the war period production of this country at the rate of six million tons per annum, or a reduction of about 75 per cent.

The coal fields of the Pas de Calais and Northern France are now in the war zone, and even after the fighting has shifted to other districts, a return to anything like normal production will be greatly delayed by repairs to transportation facilities, as well as to the mines. These fields supply nearly three-fourths of the coal mined in France, the balance coming from the Southern part of the country, where Messrs. Hailey & Davies estimate the reduction in output through enlistment to be fully 50 per cent.

*Russia*—While at no time a very important factor as a coal producer, Russia may be expected to make every effort to increase her normal output to as near her reduced home demand as possible, for cut off from England as she is, she will have to stand on her own resources.

*Spain*—The remaining country in class two is of so little consequence as a coal producer as not to affect the general situation in one way or another. It is probable

During the war period, while it is hardly to be expected that the output of coal in Japan and Australia will increase, there is every reason to believe that the supply will be about normal and that these countries will have their usual surplus for export purposes. In Table 1, I have allowed a reduction of 10 per cent. in the case of Australia to take care of a possible loss in output caused by her contribution of men to the British forces, although it is not known to what extent the supply of labor has been affected.

With Australia and Japan disposed of, we come to the two dominant factors in international trade—Great Britain and Germany. In normal times we can scarcely be classed as a competitor of these countries except in our own markets. While we lead the world as a coal producer, we stand far down in the list as an exporter, Great Britain leading with Germany second. These three nations produce over a billion tons, or more than 80 per cent. of the world's supply.

By reducing their productions and exports to percentages of the totals for the three nations, as shown in the following table, we get a fair comparison of the United States with the two principal exporting countries:

TABLE 2. PRODUCTION AND EXPORTS OF THREE LEADING COUNTRIES

| | Total Production | Total Exports | Proportion of Output Exported | Used at Home |
|---|---|---|---|---|
| United States | 48% | 16% | 4% | 96% |
| Great Britain | 27% | 56% | 26% | 74% |
| Germany | 25% | 28% | 13% | 87% |

## GERMANY

As Germany is the most seriously affected of the three leading countries in this class, we will first examine into her supplies. In normal times she produces, in round numbers, 275 million tons of fuel, of which about 85 million tons is classed as lignite. Her lignite is used mainly at home, while her exports are taken almost wholly from her bituminous supply.

A better idea of her production may be had from the following tables where the detailed figures are shown by districts.

*Messrs. Davies & Hailey, of Cardiff.

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Germany's exports for 1913 are shown in detail in Table 5. This table also includes coke, which is given here solely as a matter of interest, a review of the coke situation not being contemplated in this paper. Germany's enormous byproduct industry, on which depends her position as a producer of chemicals, dyes, etc., gives her a considerable surplus of excellent coke for export, some of which finds its way to the Pacific Coast of the United States.

Up to the beginning of the war, German exports had grown to more than 40 million tons which, however, does not represent her surplus, for she has always imported some coal from England (11½ million tons in 1913). Her home consumption is in round figures 250 million tons (including both coal and lignite), which would indicate in comparison with her production an actual surplus of something less than 30 million tons. The accompanying chart, No. 1, shows a comparison of her production, exports and imports over the past ten years.

TABLE 5. EXPORTS OF COAL FROM GERMANY IN 1913
(Gross Tons)

| Neutral Countries: | Coal | Lignite | Briquettes: Coal | Briquettes: Lignite | Total: Fuel | Total: Coke |
|---|---|---|---|---|---|---|
| Denmark | 219,711 | ..... | 95,600 | 55,240 | 370,551 | 52,337 |
| Italy | 892,463 | ..... | 304,707 | ..... | 1,197,170 | 183,456 |
| Netherlands | 7,217,606 | 10,133 | 140,871 | 282,225 | 7,650,835 | 285,223 |
| Norway | 19,170 | ..... | ..... | ..... | 19,170 | 44,492 |
| Sweden | 177,656 | ..... | ..... | ..... | 177,656 | 208,107 |
| Switzerland | 1,638,745 | ..... | 652,093 | 210,587 | 2,501,425 | 363,596 |
| United States | ..... | ..... | ..... | ..... | ..... | 18,549 |
| Spain | 279,015 | ..... | ..... | ..... | 279,015 | 37,276 |
| Mexico | ..... | ..... | ..... | ..... | ..... | 68,599 |
| Egypt | 90,003 | ..... | ..... | ..... | 90,003 | ..... |
| South America | 9,850 | ..... | 36,393 | ..... | 46,243 | 126,417 |
| Total | 10,544,219 | 10,133 | 1,229,664 | 548,052 | 12,332,068 | 1,388,052 |
| Countries at war with Germany: | | | | | | |
| Belgium | 5,728,406 | ..... | 442,843 | 103,720 | 7,174,969 | 936,516 |
| France | 3,242,175 | ..... | 319,908 | 64,075 | 3,626,158 | 2,354,918 |
| Great Britain | 11,064 | ..... | ..... | ..... | 11,064 | 5,418 |
| Russia (European) | 2,103,210 | ..... | ..... | ..... | 2,103,210 | 546,191 |
| Total | 11,084,855 | | 762,751 | 167,795 | 12,915,401 | 3,843,043 |
| German Allies: | | | | | | |
| Austria-Hungary | 12,152,500 | 49,527 | ..... | 116,756 | 12,308,783 | 1,051,670 |
| Total exports | 33,781,574 | 59,660 | 1,992,415 | 832,603 | 556,252 | 6,282,365 |

under these two general heads, and the normal and extraordinary conditions now in effect will be reviewed.

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*Class 2*—Those countries which produce less than their own requirements and must normally import coal to

tary purposes, the byproduct ovens may have to operate at above their normal rate to obtain benzol for motor fuel in the event of the petroleum or gasoline supply being shut off. It is safe therefore to assume that the German mining industry is not as badly disorganized as might at first seem.

The shipping situation and outside factors, however, take Germany out of foreign markets for the immediate future, and it is quite probable, until the end of the war.

*(To be Continued)*

## Coal and Coke Production in Pennsylvania

Following is a tabulated list showing the production of coal and coke, by the several operating companies in the second bituminous inspection district of Pennsylvania, C. B. Ross, mine inspector for the district. All of these operations are situated in Westmoreland County.

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| H. C. Frick Coke Co. | 521,391 | 328,706 |
| New Alexandria Coke Co. | 434,844 | ..... |
| Latrobe Coal Co. | 318,454 | 70,855 |
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| Mount Pleasant Coke Co. | 61,203 | 38,838 |
| E. A. Humphries Coal & Coke Co. | 47,017 | 26,649 |
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| Fort Ligonier Coal Co. | 16,591 | ..... |
| Marietta-Connellsville Coke Co. | 9,462 | 5,516 |
| W. E. Brown & Co. | 8,405 | ..... |
| Connellsville Coke & Fuel Co. | 3,582 | ..... |
| Whyel Coke Co. | 3,100 | ..... |
| Totals | 8,854,848 | 2,190,169 |

long in class one, while under present conditions the countries which come within class three will play only a small part in the readjustment of trade.

### Producing Countries That Import Coal

It is interesting to note in passing that the strongest nations in the present crisis fall in class one, which bears out the economic theory that the progress and strength of a nation depend primarily on its fuel resources. It is also interesting to note that the principal countries in the second class are now the theater of war. For this reason we may dismiss them from consideration with a few words.

*Belgium*—The Belgian coal trade, along with other industries, has been practically destroyed; her coal fields have been overrun by the armies of both sides, and it will be a long time before the damage is repaired and anything approaching normal conditions established, even should an attempt be made to work the mines under German control.

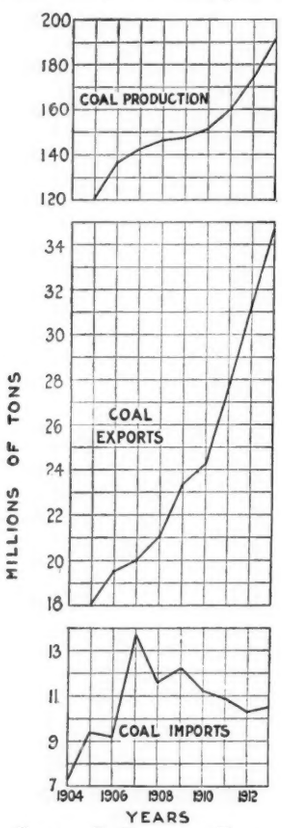


Chart I. German Production, Exports and Imports

*Austria*—While the Austrian coal trade is affected to a far less extent than that of Belgium, her normal production of 50 odd million tons will probably be seriously curtailed through the requisitioning of both men and transportation for military purposes.

*France*—The French output is normally about 40 million tons per annum. An English estimate* places the war period production of this country at the rate of six million tons per annum, or a reduction of about 75 per cent.

The coal fields of the Pas de Calais and Northern France are now in the war zone, and even after the fighting has shifted to other districts, a return to anything like normal production will be greatly delayed by repairs to transportation facilities, as well as to the mines. These fields supply nearly three-fourths of the coal mined in France, the balance coming from the Southern part of the country, where Messrs. Hailey & Davies estimate the reduction in output through enlistment to be fully 50 per cent.

*Russia*—While at no time a very important factor as a coal producer, Russia may be expected to make every effort to increase her normal output to as near her reduced home demand as possible, for cut off from England as she is, she will have to stand on her own resources.

*Spain*—The remaining country in class two is of so little consequence as a coal producer as not to affect the general situation in one way or another. It is probable that, as a neutral country, her production has been unaffected by the war.

To briefly summarize class two we are safe in concluding that they have practically ceased to be producers for the time being and that such reduced quantities as they require, must be largely obtained from other sources.

### The Exporting Countries

Class one, embracing the United States, Great Britain, Germany, Australia and Japan, covers all of the potential competitors for foreign trade and represents about 90 per cent. of the world's coal production. Japan and Australia are somewhat limited in their export opportunities, the former by the quality of her coal and the latter by her smaller tonnage. At the same time, these countries are factors to be reckoned with in the world's markets, the United States having felt this competition even at home, where Australian and Japanese coal is perhaps better known on the Pacific Coast than the American product.

The coal exports of Australia aggregate from two to three million tons annually, while those of Japan are around four million tons. On the West Coast of South America, Australia proves a most formidable competitor of ours, while Japan may be expected to take such trade as she is in a position to handle, besides being the dominant factor in the Far East.

During the war period, while it is hardly to be expected that the output of coal in Japan and Australia will increase, there is every reason to believe that the supply will be about normal and that these countries will have their usual surplus for export purposes. In Table 1, I have allowed a reduction of 10 per cent. in the case of Australia to take care of a possible loss in output caused by her contribution of men to the British forces, although it is not known to what extent the supply of labor has been affected.

With Australia and Japan disposed of, we come to the two dominant factors in international trade—Great Britain and Germany. In normal times we can scarcely be classed as a competitor of these countries except in our own markets. While we lead the world as a coal producer, we stand far down in the list as an exporter, Great Britain leading with Germany second. These three nations produce over a billion tons, or more than 80 per cent. of the world's supply.

By reducing their productions and exports to percentages of the totals for the three nations, as shown in the following table, we get a fair comparison of the United States with the two principal exporting countries:

TABLE 2. PRODUCTION AND EXPORTS OF THREE LEADING COUNTRIES

| | Total Production | Total Exports | Proportion of Output Exported | Proportion of Output Used at Home |
|---|---|---|---|---|
| United States..... | 48% | 16% | 4% | 96% |
| Great Britain..... | 27% | 56% | 26% | 74% |
| Germany..... | 25% | 28% | 13% | 87% |

### Germany

As Germany is the most seriously affected of the three leading countries in this class, we will first examine into her supplies. In normal times she produces, in round numbers, 275 million tons of fuel, of which about 85 million tons is classed as lignite. Her lignite is used mainly at home, while her exports are taken almost wholly from her bituminous supply.

A better idea of her production may be had from the following tables where the detailed figures are shown by districts.

*Messrs. Davies & Hailey, of Cardiff.

TABLES 3 AND 4. GERMAN OUTPUT OF COAL AND LIGNITE FOR 1912 AND 1913

Coal Table 3

| District | 1912 | 1913 |
|---|---|---|
| Prussia: | | |
| Dortmund | 100,265,000 | 110,722,000 |
| Breslau | 46,584,000 | 49,077,000 |
| Bonn | 17,736,000 | 20,657,000 |
| Clausthal | 708,000 | 948,000 |
| Halle | 9,000 | 8,000 |
| Total Prussia | 165,302,000 | 181,412,000 |
| Saxony | 5,066,000 | 5,471,000 |
| Alsace Lorraine | 3,539,000 | 3,817,000 |
| Bavaria | 791,000 | 811,000 |
| Total | 174,698,000 | 191,511,000 |

Lignite Table 4

| District | 1912 | 1913 |
|---|---|---|
| Prussia | 67,476,000 | 70,256,000 |
| Saxe-Altenburg | 4,162,000 | |
| Saxony | 5,332,000 | 6,316,000 |
| Brunswick | 1,726,000 | |
| Anhalt | 1,492,000 | |
| Hesse | 444,000 | |
| Bavaria | 1,700,000 | 1,895,000 |
| Other states | 8,000 | |
| Total | 82,340,000 | 78,467,000 |

Note. Figures are in gross tons.

About 25 per cent. of the lignite is used in briquetted form, in which industry Germany may be considered the leader. Six million tons of coal briquettes are also manufactured annually, and it is appropriate to state here that the attention the Germans give to the preparation of their coal for market is far above that of any other country. Wherever German and British coal has competed on anything like an equal basis, and the decision between the two fuels has been close, the superior preparation of the German product has frequently proven the deciding factor. Thus the successful German invasion of the French market against English coal a few years ago has been credited entirely to the perfect manner in which the German fuel was prepared for French requirements.

Germany's exports for 1913 are shown in detail in Table 5. This table also includes coke, which is given here solely as a matter of interest, a review of the coke situation not being contemplated in this paper. Germany's enormous byproduct industry, on which depends her position as a producer of chemicals, dyes, etc., gives her a considerable surplus of excellent coke for export, some of which finds its way to the Pacific Coast of the United States.

Up to the beginning of the war, German exports had grown to more than 40 million tons which, however, does not represent her surplus, for she has always imported some coal from England (11½ million tons in 1913). Her home consumption is in round figures 250 million tons (including both coal and lignite), which would indicate in comparison with her production an actual surplus of something less than 30 million tons. The accompanying chart, No. 1, shows a comparison of her production, exports and imports over the past ten years.

TABLE 5. EXPORTS OF COAL FROM GERMANY IN 1913
(Gross Tons)

| Neutral Countries: | Coal | Lignite | Briquettes—Coal | Briquettes—Lignite | Total—Fuel | Total—Coke |
|---|---|---|---|---|---|---|
| Denmark | 219,711 | ..... | 95,600 | 55,240 | 370,551 | 52,337 |
| Italy | 892,463 | ..... | 304,707 | ..... | 1,197,170 | 123,456 |
| Netherlands | 7,217,606 | 10,133 | 140,871 | 282,225 | 7,650,835 | 285,223 |
| Norway | 19,170 | ..... | ..... | ..... | 19,170 | 44,492 |
| Sweden | 177,656 | ..... | ..... | ..... | 177,656 | 208,107 |
| Switzerland | 1,638,745 | ..... | 652,093 | 210,587 | 2,501,425 | 363,596 |
| United States | ..... | ..... | ..... | ..... | ..... | 18,549 |
| Spain | 279,015 | ..... | ..... | ..... | 279,015 | 37,276 |
| Mexico | ..... | ..... | ..... | ..... | ..... | 68,599 |
| Egypt | 90,003 | ..... | ..... | ..... | 90,003 | ..... |
| South America | 9,850 | ..... | 36,393 | ..... | 46,243 | 126,417 |
| Total | 10,544,219 | 10,133 | 1,229,664 | 548,052 | 12,332,068 | 1,388,052 |
| Countries at war with Germany: | | | | | | |
| Belgium | 5,728,406 | ..... | 442,843 | 103,720 | 7,174,969 | 936,516 |
| France | 3,242,175 | ..... | 319,908 | 64,075 | 3,626,158 | 2,354,918 |
| Great Britain | 11,064 | ..... | ..... | ..... | 11,064 | 5,418 |
| Russia (European) | 2,103,210 | ..... | ..... | ..... | 2,103,210 | 546,191 |
| Total | 11,084,855 | | 762,751 | 167,795 | 12,915,401 | 3,843,043 |
| German Allies: | | | | | | |
| Austria-Hungary | 12,152,500 | 49,527 | ..... | 116,756 | 12,308,783 | 1,051,670 |
| Total exports | 33,781,574 | 59,660 | 1,992,415 | 832,603 | 556,252 | 6,282,365 |

The enormous growth of the German coal exports, as shown on this chart, has been a matter of grave concern to the British shippers who in many markets have felt keenly the effect of this growing competition.

It has been estimated that the German production will be curtailed 40 per cent. during the war period, which will give her an output of 110 million tons. The exact figures, however, are of little value in the present calculations, for it must be evident that in her present position, and with Great Britain in command of the sea, Germany will have no surplus of consequence beyond home requirements and the needs of her allies and neighbors; it must be remembered that she is connected with the Italian markets by the Gothard Railway and has continued to make some shipments over that route.

It should be understood that, like other industries in this methodical country, the coal trade is thoroughly organized, is under government control and the distribution and sale of coal are strongly centralized. Hence the supply is systematically regulated to meet the demand, and in this respect, Germany stands alone.

We have ample evidence of her preparedness for war in more than a military sense, and it is not far amiss to assume that this preparedness includes a complete program for the coal industry to cover all conditions. Besides coal for naval use, railways and other direct military purposes, the byproduct ovens may have to operate at above their normal rate to obtain benzol for motor fuel in the event of the petroleum or gasoline supply being shut off. It is safe therefore to assume that the German mining industry is not as badly disorganized as might at first seem.

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# The Wendell Continuous Centrifugal Drier

By E. A. Holbrook*

*SYNOPSIS—Early history of the development of the continuous centrifugal drier invented by Carl A. Wendell. The difficulties to be overcome in drying the washed coal as it comes in a continuous supply from the washing machines. A detailed description of the drier and its continuous operation, together with the tabulated results of three of these machines installed at the Woodward Iron Co.'s washery at Woodward, Ala.*

Prominent among recent improvements in coal-washing machinery is the Wendell Continuous Centrifugal Drier, now in operation at the new coal washery of the Woodward Iron Co., Woodward, Ala. Its unique principle and possible field of application demand the close attention of all engineers interested in centrifugal drying.

The inventor of this machine, Carl A. Wendell, is experimental engineer for the Joliet works of the Illinois Steel Co. Several years ago, while engaged in testing work at the company's coal washery at Joliet, Ill., Mr. Wendell encountered the universal difficulty of economically drying the finer sizes of washed coals—an operation that is a prerequisite to successful coking. After four years of work and the expenditure of many thousands of dollars by the people interested, a satisfactory continuous centrifugal drier was perfected and given exhaustive tests at the coal washery mentioned above. Last summer a battery of three of these driers was installed at the Woodward washery. Their continuous operation, night and day, for four months has since demonstrated their ability to stand up under the hard knocks of a large commercial washery and in the hands of the usual washery labor.

## General Considerations

In washing coal, the finer the preliminary crushing to which it is subjected the more perfectly will the coal and fine refuse contained be disengaged from each other, and the more perfect will be their separation in the coal-washing machines. This is especially true of the finer flakes of pyrite, the removal of which is usually so necessary before a coal is fit to be made into metallurgical coke. Furthermore, since modern practice in coke making often demands that 80 per cent. of the coal shall pass through a ⅛-in.-mesh sieve, it would seem that fine crushing and washing would produce an ideal product for coke making.

Coal washing is a process involving submergence in water, and only those who have tried to drain and save the finer sizes of the washed coal, say the sizes below ⅝ in. in diameter, realize the outlay and loss of time involved in the usual arrangement of draining bins. An enumeration of these difficulties would disclose the weaknesses and failure of most coal-washing plants, in respect to the finer sizes of coal. The ridding of the coal of its moisture, by means of a centrifugal drier, is not in itself a new idea. Several forms of centrifugal dewaterers, among which may be mentioned the English "Wilton" machines, have been applied to drying washed coal, but have met with the following difficulties:

1. The tonnage to be handled is far greater than that used in the usual centrifugal-drying processes. 2. These older driers had to be loaded, then started, brought up to full speed and finally stopped before their content could be discharged. This involved delay, and as the weight of a large centrifugal drier and its load was considerable, the horsepower expended in bringing the machines up to full speed at each charge was excessive. 3. This intermittent action interfered seriously with the feeding of the machine, as the washer preceding it is continuous in its action and, consequently, a storage had to be provided between the washer and the intermittent drier. 4. All previous attempts to make a drier continuous have involved the introduction of a stationary or differential plow or scraper inside the screen of the machine. As the coal lying against this screen is moving with a peripheral speed of over 6000 ft. per min., with the consequent great centrifugal force, such a scraper will either pulverize the coal and become quickly worn and broken itself, or it will tear and ruin the containing screen.

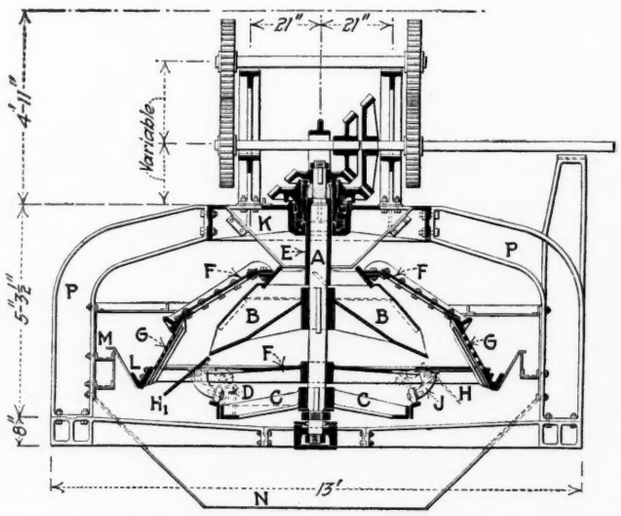



Fig. 1. Sectional Diagram of the Wendell Centrifugal Drier

## Description of the Drier

The sectional diagram, Fig. 1, has been carefully prepared to show the essential parts only of the machine. The following detailed description of principle will refer to this figure, which is an elevation of which the plan would be circular. Fig. 2 is a general view showing the Wendell drier and frame, with all gears inclosed, for safety, as installed in the Woodward washery.

The following illustration will assist the mind to better understand the principle of the drier. Given a railroad train moving at 75 mi. per hr., any attempt to get aboard a train moving at that speed would naturally result in disaster. If, however, one was on another train, run-

*Assistant professor of mining engineering, University of Illinois, Urbana, Ill.

ning parallel with the first and moving at a rate of either 74 or 76 mi. per hr.—a difference of only one mile an hour—no difficulty would be experienced in passing from one train to the other. This is the general basic principle on which is based the method of charging and discharging the drier while in rapid rotation; namely, differential speeds.

To the central shaft *A* (Fig. 1), which revolves at, say 249 r.p.m., are attached the two feed-spouts *BB* and the cam frame *C* with its cam *D*. Outside of this shaft revolves the hollow retainer shaft *E* to which is attached the retainer *F*, the screens *G* and the discharge gates *H* and $H_1$. The speed of the outer shaft *E* is 250 r.p.m., or 1 r.p.m. faster than the inner shaft *A*. The gates *H* and $H_1$ are 16 in number, four in each quadrant. Each gate is attached to a tappet *J* and, normally, stays closed, as at *H*. When, however, the cam *D*, which is moving at a speed 1 r.p.m. less than the gates, is overtaken by a tappet *J* the gate is opened gently and without shock, as at $H_1$, letting out the dried coal contained in this section. When the cam has passed, the gate returns to its closed position, as at *H*, and the section is then ready to receive another charge of coal from the feed-spouts *BB*, the discharge from which is continuous. The position of the feed-spout on the shaft *A* is slightly ahead of the cam *D*, thus giving time for the gate *H* to close before the section will receive a new load of coal from the retainer.

From the above description it will be seen that the course of the coal is as follows: The coal, fed wet into the hopper *K*, falls into the revolving feed-spout *B*, from where it is thrown against the screen *G*. For a minute only, it stays in this section, revolving at a peripheral speed of over 6000 ft. per min. Any contained water is, of course, thrown through the screen into the water collector *L*, from which it is lifted by centrifugal force into the water sluice *M*. Each minute, as before stated, the cam overtakes and opens the gate of the compartment. Discharge takes place immediately, the outward slope of the screen *G* giving a downward component to the centrifugal force, which aids gravity in discharging the coal which has been dried and falls through the conical spout *N*, into a car or belt below. A heavy cast-steel frame *P* completes the necessary parts of the drier.

Fig. 3 shows the retainer *F* separated and removed from the outer shell of the machine and exposes to view the screen-plates *G* mentioned above. In the machines now in commercial use, these plates are double, made up of an outer ¼-in. steel plate, with ⅝-in. perforations on ⅞-in. centers, which act as a support for an inner plate of monel metal with $\frac{1}{16}$-in. perforations on ⅛-in. to ¼-in. centers. Of course, any other sizes might be used. Mr. Wendell has found that monel metal meets all the requirements better than any other that has been so far tried, it being noncorrosive and standing up well under the service to which it is subjected.

### Engineering Data Concerning the Drier

The original design of the Wendell drier was estimated to handle 30 tons of coal per hour. The new design installed in Alabama has proven able to handle 50 to 60 tons of coal per hour continuously. Run at a speed of 250 and 249 r.p.m., the driers received washed coal from a ⅝-in. round-hole screen which contained from 30 to 40 per cent. of water. This mechanical moisture was reduced by the drier to 6 per cent. Wishing to have about 8 per cent. mechanical moisture in the coal charged to the coke ovens, the Woodward company decreased the speed of the drier to 215 r.p.m., and is now averaging the desired moisture. About 18 hp. is used per drier.

The weight of the revolving parts and the thrust of the vertical shaft are taken by four sets of ball bearings, which, being of the finest imported steel, secure the low, rolling friction that is necessary with heavy, high-speed machinery. As one shaft revolves in the same direction and at a speed of only 1 r.p.m. different from that of the other, practically all the wear usual in such cases is obviated.

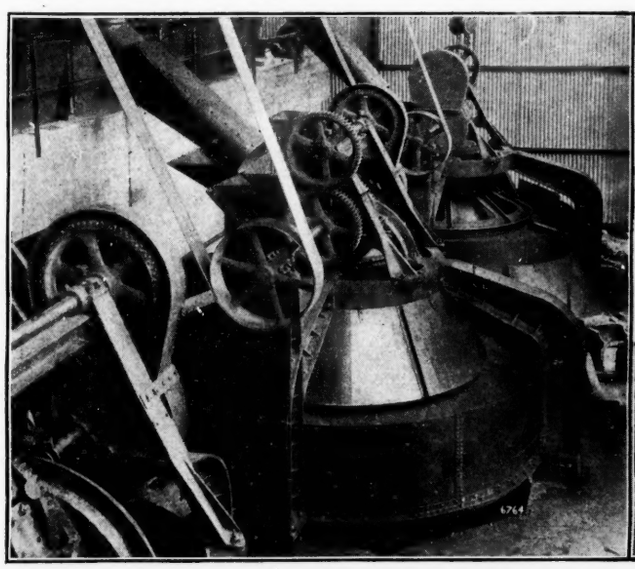


Fig. 2. Wendell Continuous Driers, Woodward Washery, Woodward, Ala.

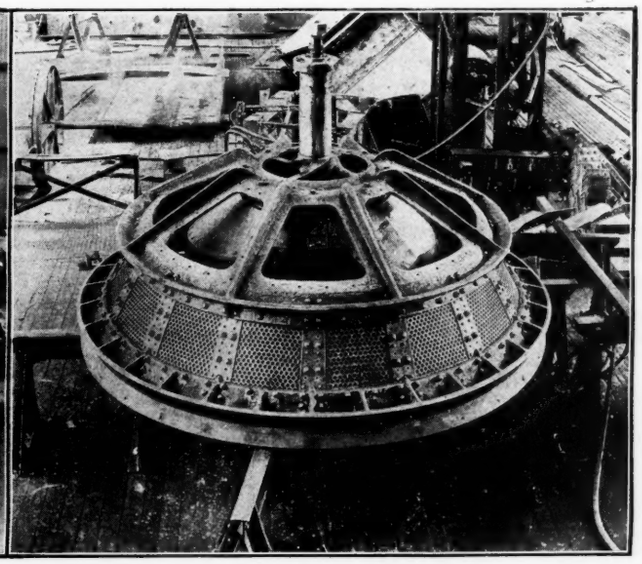


Fig. 3. Drier with Outer Shell Removed, Showing Retainer and Screen Plates

The drier may be fed directly from the washer or, by dewatering-bucket elevators, from recovery tanks. In spite of the larger amount of water in the direct feed, no greater amount of sludge was found in the water coming from the drier, under these conditions. It is probable that, as soon as the centrifugal action begins in the drier, the finer coal fills the interstices between the larger pieces, thus acting as a screen in itself.

### Breakage, Losses, Etc.

The following tests show the total breakage in the washery and drier combined, as now being made at the Woodward plant:

| | Through ½-In. Round-Hole Screen, over ¼-In. Round-Hole Screen, Per Cent. | Through ¼-In. over ⅛-In. Per Cent. | Through ⅛-In. Per Cent. | R.p.m. of Drier |
|---|---|---|---|---|
| Raw coal to washery..... | 27.5 | 32.3 | 40.2 | |
| Washed coal, No. 1 drier.. | 15.2 | 34.1 | 50.7 | 227 |
| Washed coal, No. 2 drier.. | 18.1 | 40.7 | 41.2 | 214 |
| Washed coal, No. 3 drier.. | 19.6 | 43.1 | 37.2 | 204 |
| Average of three driers... | 17.6 | 39.3 | 43.0 | 215 |

It is obvious that both the breakage and the resultant moisture content may be changed by: 1. Changing the speed of the machine as a whole, thus increasing or decreasing the centrifugal force directly as the square of the speed. 2. Changing the gear ratio between the inner and outer shafts, thus changing the period of time that a charge is contained in the drier. 3. By reducing the capacity of a given machine, thereby reducing the thickness of the layer of coal on the screen plates through which water is to be driven.

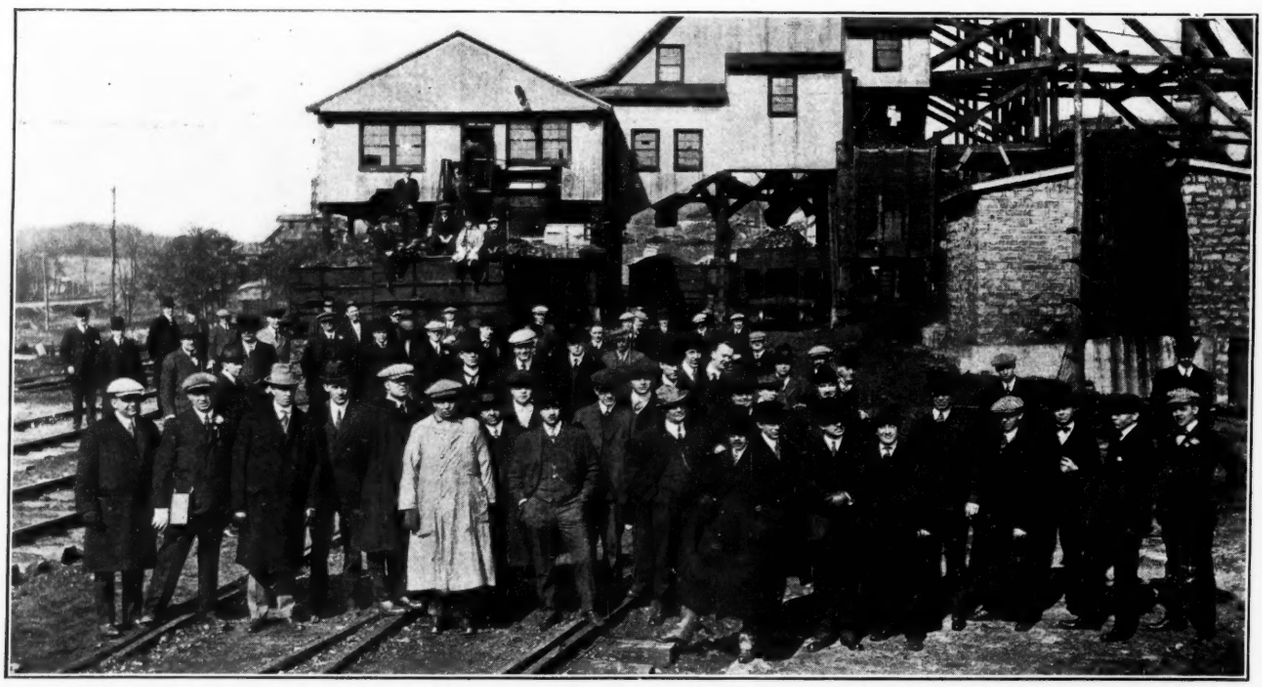
To the engineering profession, in general, an inspection of the drier suggests, with modifications to suit different requirements, a wide field of application. As driers in sugar refineries, in sewage-disposal plants, in the manufacture of ammonium sulphate or even in the treatment of sands and slimes in an ore-dressing plant, such a machine has interesting possibilities.

In conclusion, the author wishes to thank Mr. Wendell for allowing the inspection of drawings and of the original machine; and also the Link-Belt Co. of Philadelphia and Chicago, by whom the machines are manufactured, for the photographs used.

## Chicago Coal Dealers Visit New River Field

About fifty of the most prominent retail coal dealers of Chicago, and a few from other points in the Middle West, were guests of the C. & O. Ry. and the sales agencies and operators of the New River field last week. Four days were spent inspecting the mines in this field, and the visitors were enthused over the section, the quality of the coal and the care exercised in mining and handling it.

The party, which left Chicago on Sunday, was entertained on a special train throughout the week. They were joined in this section by a number of local men, who accompanied them throughout the trip. The itinerary included Loop Creek, Piney Branch, Winding Gulf, and other points on the C. & O. lines in the New River field.



Chicago Coal Dealers at Eccles, W. Va.

On Tuesday evening a smoker was tendered them at the Dun Glen Hotel at Thurmond, which proved a most enjoyable affair. In addition to a number of talks and an evening of good fellowship, they were entertained by the Pork Chops Orchestra of Cincinnati.

This trip, in which business and pleasure were combined, was planned and managed throughout by H. M. Hall, general agent of the C. & O. at Chicago. The move met with the coöperation of the New River operators and sales agencies, who shared in the expense of the week's entertainment for the entire party. Several other prominent officials of the C. & O. also accompanied them.

Altogether the trip was a most pleasing one to the visitors and they were loud in their praise of the splendid entertainment accorded them and of the wonderful coal section they inspected.

# Autogenous Welding by the Thermit Process

By Frank H. Kneeland

*SYNOPSIS—When powdered aluminum is mixed with iron oxide and a portion of the mixture heated to a certain temperature, a self-propagating reaction is started whereby the oxygen leaves the iron and unites with the aluminum. This chemical transfer of the oxygen evolves intense heat and results in the formation of highly heated liquid low-carbon steel which may be employed for autogenous welding.*

The chemical element aluminum has long been known to exist, being the most widely distributed metal in nature. In the natural state, however, aluminum is never found free, but always in combination with oxygen. The affinity between these two elements is so strong that, although aluminum has long been known to chemists, it was not until the invention of the electric furnace that this metal has been produced in anything like commercial quantities.

But aluminum in the form of kitchen utensils, electric transmission cables, etc., is by no means the only state in which it may be made to serve the purpose of man. Its strong affinity for oxygen when in a heated condition may be taken advantage of with results which are at once highly spectacular and utilitarian.

When finely divided aluminum is mixed in the proper proportions with a metallic oxide—barium, molybdenum, copper, iron—and the mixture heated to a certain temperature, a chemical reaction takes place accompanied by the evolution of heat, and the oxygen leaves the other metal, uniting with the aluminum. The resultant mass is thus composed of a liquid slag (aluminum oxide) and an almost pure metal in a molten state and well above the melting temperature.

For many years chemists knew of this reaction, and many attempts were made to utilize it for the reduction of various metals from their oxides. The greatest difficulty was encountered, however, in governing the reaction, since if this were started by heating the entire mass, its rapidity was practically equivalent to an explosion.

Dr. Hans Goldschmidt, while attempting to produce pure metals to be used in the alloying of steel for the famous German steel-making firm of Krupp, discovered that if the reaction were started only in a small portion of the mass it was not only self-propagating and would spread to all portions of the mixture, but that it was easily controlled. The first experiments of this nature were conducted with chromium oxide, resulting in the production of practically pure metallic chromium. Later experiments were made on other oxides, sulphides and chlorides and manganese, ferrochromium, molybdenum, ferrotitanium and other pure metals, and alloys were produced.

### The Experiments with Iron

Among other substances with which Dr. Goldschmidt experimented was the oxide of iron. It was here found, however, that the reaction not only produced a very pure low-carbon steel, but that the heat evolved was extremely intense. The temperature attained was so high that it could not be measured by pyrometer, but has been calculated theoretically at 4881° F.

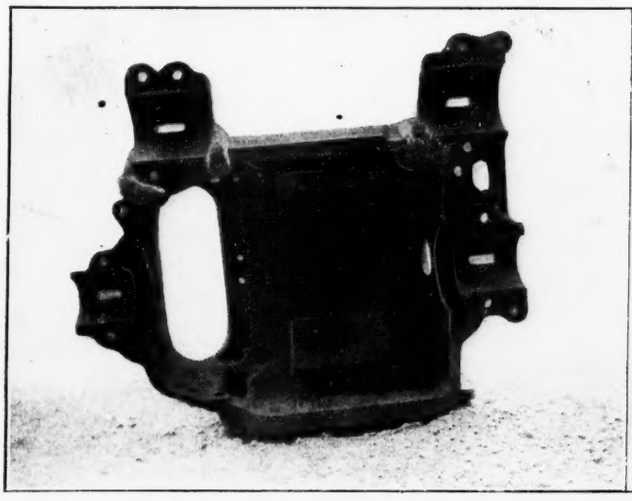


Fig. 1. Thermit Welds on Electric Motor Case

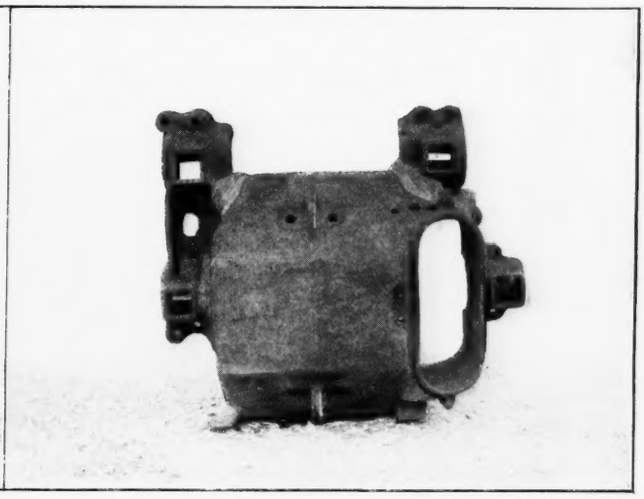


Fig. 2. Another View of the Same Motor Case

Dr. Goldschmidt at once decided that this extreme heat, produced quickly and easily and resulting in highly heated molten steel, could be advantageously employed in the arts and sciences. The mixture of powdered aluminum and iron oxide was named "thermit," and since its commercial introduction in 1901 has been steadily growing in favor for certain purposes, especially for heavy autogenous welds in steel or iron, cast or wrought.

It is needless to say, however, that like many another process spectacular in application and results, thermit has been the subject of much popular misconception and has been often credited, even by those who should know

better, with powers and accomplishments which it does not in reality possess. The ability of a handful of this powder to melt a hole in a steel safe, for instance, is absurd.

On the other hand, the rapidity and violence of the thermit reaction are nothing short of spectacular and have called forth from various observers some extremely vivid expressions in lucid English.

After witnessing the welding of a 14-in. shaft for a rock crusher at the plant of the Goldschmidt Thermit Co. in Jersey City, one of the editors of the *Scientific American* described the reaction in the Nov. 18, 1911, issue as follows:

> After adding a teaspoonful of ignition powder (barium peroxide and aluminum flake) to each hopper, the reaction is started by introducing a red-hot iron bolt. A flash, a glare, a hiss and sputter, and clouds of smoke envelop all, as the elements wrestle in fierce combat for union with the coveted oxygen; the greater affinity of the aluminum quickly asserts itself, and after a 40-sec. round the iron is vanquished, thrown out of combination and enslaved in the service of man.

### A Typical Application

The application of thermit to welding is extremely simple. Let us assume, for instance, that a broken shaft, say 8 in. in diameter, is to be repaired. If this shaft is accessible for a distance of about 12 in. on all sides of the fracture, there is in certain cases no necessity of removing it from its bearings. In any case by means of drilling, chipping or hacksawing, the metal upon one side of the break is cut away for a distance of 1 or 2 in. so as to allow the thermit steel ample space to flow readily between the two parts and amalgamate with them.

The two portions of the shaft are next carefully aligned and secured in position, suitable allowance being made for the contraction of the metal forming the weld upon cooling. Wax is next forced between the ends of the two pieces of the shaft and built up in the form of a collar around the entire circumference. This wax forms the pattern for the weld and should be constructed accordingly. A mold-box, or flask, is next built around the shaft where the weld is to be made, leaving a clear distance of 10 to 12 in. on all sides.

The mold proper is now made and rammed. A mixture of fire clay and silica sand is used for the body of the mold, while brickdust is added to this mixture for the portion immediately surrounding the wax pattern. A pouring gate, a heating gate and a riser must also be provided, the two former passages connecting to the bottom of the wax pattern, while the riser of course leads upward from its highest point. The heating gate must slant downward from the pattern and out through an opening in the mold-box. The pouring gate may extend either vertically or on a slant upward through the mold. These passages, as well as the riser, are made in the ordinary manner by means of removable wooden patterns.

When the mold is complete and the gate and riser patterns are withdrawn, a gasoline heater is applied through the heating gate. This first melts out the wax pattern and then heats the inside of the mold and the ends of the shaft. The action of this torch should be continued until the parts to be welded have attained a bright red color.

In the meantime the crucible in which the thermit reaction takes place is made ready. This crucible is conical in form, lined with magnesia tar and provided with a tapping hole in the bottom. The latter is plugged in such a manner that a slight blow or push upward on a pin extending down through the hole will release the thermit steel, which will then flow into the pouring gate.

The proper amount of thermit to use may be found by multiplying the weight of the wax employed by 30, but for most classes of work tables of dimensions and weights of thermit have been compiled.

After the pieces to be welded have been made sufficiently hot the torch is withdrawn and the heating gate plugged with brickdust, sand and clay. The thermit reaction is next started in the crucible by means of a small amount of ignition powder, which is in reality barium thermit—a mixture of barium peroxide and powdered aluminum. The reaction of this powder, which may be started with a match, develops enough heat to start the reaction of the steel thermit.

The chemical reaction which takes place in the powdered thermit is represented by the following equation:

$$Fe_2O_3 + 2\,Al + \text{heat} = Al_2O_3 + 2\,Fe + \text{heat}$$

or

$$3\,Fe_3O_4 + 8\,Al + \text{heat} = 4\,Al_2O_3 + 9\,Fe + \text{heat}.$$

When the reaction is complete the tapping gate in the crucible is opened, and the highly superheated liquid steel

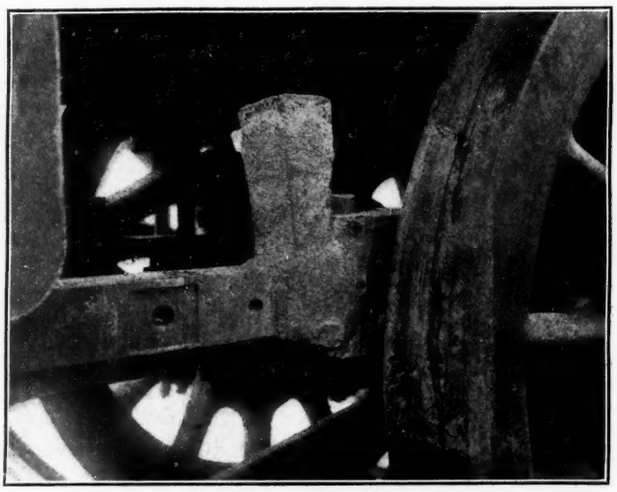


Fig. 3. Weld in Frame of Kellys Creek Colliery Co.'s Locomotive No. 2

is allowed to flow into the mold. Because of the cutting away of the broken ends of the shaft and the reinforcing collar originally formed in the wax pattern, the thermit steel entirely surrounds the ends to be welded; and possessing several hundred degrees of superheat, it actually melts and fuses with the original metal of the shaft, making a perfect and homogeneous weld.

### The Mold Should Be Left in Place for Some Time

To prevent chilling and consequent undue hardening of the steel, the mold should be left in place for several hours, mold and weld gradually cooling down together, thus tending to anneal the metal. When sufficiently cold, say in 12 hr., the mold may be knocked to pieces, the weld in the shaft cleaned by rapping or with a scratch brush, the gates and riser chipped or drilled off and the shaft put to work again.

Shafts are, however, by no means the only machine parts that may be repaired by the aid of thermit. Broken spokes in gears or flywheels may be easily mended; broken teeth in gearwheels may be recast and finished up

either by hand or in a shaper; broken bedplates, frames, rocker-arms, connecting-rods, cylinder heads, the end or side plates of steam or electric locomotives, motor casings, locomotive drive wheels, pump casings or frames, etc., may be repaired with equal facility. A long crack in cast-iron is perhaps the most difficult repair to make by this method, and one which is seldom, if ever, accomplished with success. This is due to the fact that thermit steel possesses different physical qualities from cast-iron and has a greater coefficient of expansion. It consequently shrinks more than the iron in cooling, and since the crushing strength of the iron is greater than the tensile strength of the steel, the latter tends to pull apart. This action usually results in the formation of small cracks extending transversely across the weld. Repairs of this kind, especially if they must be water- or air-tight, can usually be better accomplished by some other means.

### Thermit in Pipe Welding

Another use for thermit, or rather for the intense heat which it generates, has been recently developed in the butt or end welding of pipe to form water, air, steam or ammonia lines. Here the ends of the pipe are faced off square and placed in a special mold. The thermit reaction is started in a flat-bottomed crucible, and when complete, both slag and metal are poured into the special mold around the pipe. The slag floating on top of the steel of course enters the mold first and thinly glazes both pipe and mold. The steel following later does not come into actual contact with either, but the heat developed is such that when the ends of the pipe are forced together under the action of suitable drawbars a perfect butt weld is secured. On cooling, the mold may be removed and the slag knocked off. A pipe line thus built up is, when completed, practically one continuous length of pipe and is correspondingly free from leaks.

Although most lines of industry, particularly the railroads of the land, have long since adopted the use of thermit in many classes of repair work, but few mining companies have seen fit to use this method of repair. Thermit is used at present, however, by several of the larger companies, both in West Virginia and Pennsylvania. Some of these firms have employed it for several years and are annually saving many hundreds of dollars in repairing broken parts that otherwise would be consigned to the scrap heap.

As all mining men know, the cost of repairing a breakdown in mining equipment can by no means be measured by the expense of repair parts. The real measure of the cost is the loss of output. The welding of a broken locomotive frame, a motor case, the main frame or bull wheel of a coal cutter not only renders useful at small expense material that would otherwise be lost, but also, since it can be accomplished in a few hours or at most in a few days, keeps equipment in operation which would otherwise be idle.

**The SUCCESS Number of "Coal Age"** on Apr. 3 will be the most practical number of this paper so far issued. The reason is that every story in this number describing a method or a machine must cover an instance of actual operation at a coal mine. These are the facts we are looking for, and it is such data as these that come in handy for application in our own daily work. Several of our readers are sending in little stories covering the life and work of men with whom they are acquainted or associated. All of these stories are interesting and tell how the subject of the sketch fought his winning fight in life. Have you sent in something yet? Do it today.

## Extracts from a Superintendent's Diary

We have in our camp one man at least who is well versed in the science of political economy, assuming that his own estimate of his learning is correct. His discipleship might be described as a composite influence of Ricardo, Adam Smith, Mill, Marx and others, and he can quote from any of them, impromptu and at great length whenever occasion demands. It is more than possible that at times he takes liberties, innocently, no doubt, with the principles of his Patron Saints and gives them credit for ideas which they would not have been able to identify, but as none of his hearers are the wiser, and as the effect of his remarks, as concerns his audience, is always satisfactory, his accuracy is never questioned.

Like most self-appointed leaders of the downtrodden masses, he has a way of working himself up to the haranguing point on very slight provocation and with the first manifestation of approval from his audience, he braces up preparatory to taking the weight of the world upon his shoulders.

In reading any of the great works on political economy, sentences are occasionally encountered that seem to suggest rather faintly that the author felt that some of the evils of society could be remedied if his ideas might be intelligently carried out. It is not strange then that our economist, in absorbing the thoughts of all of the economists, should feel confident of his ability to lead his comrades out of the capitalistic mire and reform modern industry.

As an introduction for all of his set speeches he starts off with a statement alleging that capitalistic control over labor dates back several centuries to the time when the English owners of small farms allowed themselves to be deprived of their land by laws secretly demanded by the owners of the large town factories that were just beginning to spring up. Then he goes on to explain that changing conditions compelled many of those small land owners to abandon their farms, law or no law, but even they might have been able to regain their lands in time had it not been for the secret influence of the capitalists on the lawmakers. Capitalists never fight in the open, if he is to be believed.

Today I received a letter from our general manager in which he stated that for some time he has been receiving anonymous letters, sent to him by someone in our camp, complaining about many things in general but in particular about me and my efforts to discourage the public celebration of some holidays. The manager went on to say that at first he rather enjoyed the letters but now they were becoming annoying and he requested me to locate the writer if possible and deal with him as I saw fit. One of the anonymous letters was inclosed and I recognized the authorship at once.

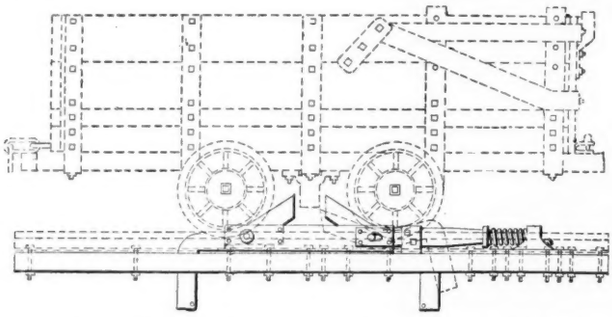
It happened that its author, the camp's political economist, the decrier of capitalistic duplicity, came into my office a few moments later to borrow a certain volume on taxation. I had the book in one of the drawers of my desk and just before passing it over to my visitor I picked up the letter from our manager and slipped it in between some of the pages. As he was leaving I remarked that I hoped that after he finished reading everything that he found in the book he would come back and give me his views as to an honorable way to deal with people who would not fight in the open.

## A New Car-Stop and Shock Absorber

A device of interest to coal operators has just been placed on the market. It is the invention of Edwin W. Baum, of Nokomis, Ill., and is patented. The device is used as a car-stop and shock-absorber.

There has always been a loss of time connected with the caging of coal cars, due to the fact that cages heretofore have been constructed in a way that compelled the car being brought practically to a standstill before the signal to hoist was given.

The sketch shows the device installed on a cage platform in position to stop car and absorb shock of the same. This



THE CAR STOP IN POSITION ON THE CAGE

overcomes any and all loss of time in the caging of coal cars, as there is no limit to the speed with which they may be caged.

This invention has been in daily use at the Nokomis Coal Co.'s mine, at Nokomis, Ill., since Sept. 19, 1914, and has been thoroughly tested with loaded cars weighing 7 tons which were released from automatic cagers located on a 4 per cent. grade.

This device overcomes all the weak points found in many other styles of cages as regards speed and safety.

The following is what the inventor claims for his invention: This device receives and absorbs the shock of the loaded or empty mine car when run on the cage, reducing to a minimum the wear and strain on cages, also preventing the breaking of lugs on the bottom of mine cars, and absorbing the shock of the rebound of the car when the cage leaves the dump. It requires practically no attention after once installed, and by reducing the number of daily wrecks, effects a considerable saving for the operating company.

## Mineral Exhibit at San Francisco

To illustrate the development of the mineral resources of the United States the Geological Survey exhibit at the Panama-Pacific International Exposition includes a graphic representation of the output of the various mineral products of the country, based on the production per capita during the centennial year, 1876, and at the present time. Bituminous coal is represented by a block of coal weighing 1600 lb., the per capita production in 1876, and by another block weighing 5 tons (10,000 lb.), the per capita output in 1913. The anthracite blocks, on the other hand, indicate relatively small gain, from 1140 to 1880 pounds.

The per capita production of coke has increased from 134 lb. in 1876 to 700 lb. in 1913. At the earlier period no other than beehive coke was manufactured in the United States, but since then the interesting feature of coke manufacture has been the development of the retort oven, by which valuable constituents of the coal other than coke are recovered. The exhibit at San Francisco shows the quantity of coal consumed in retort ovens in this country in 1913, the quantity of coke produced from it, and the quantity of coal tar, benzol, and sulphate of ammonia recovered as byproducts. The quantity of gas recovered and utilized is also properly shown.

## Rockefeller Secures Interest in Consolidation Coal Co.

It was recently here stated that John D. Rockefeller had acquired a substantial interest in Consolidation Coal Co., with a view to diverting some of its profitable coal traffic to Western Maryland Ry., in which Mr. Rockefeller is also heavily interested.

It is confirmed that he purchased, or what is its equivalent, underwrote, the issue of $7,000,000 7% two-year convertible debenture bonds, principal and interest of which can be converted into stock when the bonds fall due. This will give Mr. Rockefeller $8,000,000 Consolidation Coal stock at expiration of two years, in addition to which he has a two years' option on certain large blocks of other stock owned and held by interests close to the management.

Exercise of conversion privilege on debenture bonds and of stock option at end of two years will place Mr. Rockefeller in control of the management; and although it can be truthfully stated by officials that no stock has changed hands, and no immediate changes in board or officers will occur, it is also confirmed that Mr. Rockefeller is exercising enough influence at this time to divert 5,000,000 tons of Consolidation Coal traffic to Western Maryland, and that every preparation is being made by Western Maryland to handle this increased business.

While Senator Watson pointed out that many of the Consolidation's properties were not tapped by Western Maryland, and that the Somerset properties in Pennsylvania were 40 miles from the Western Maryland lines, it was also pointed out here that this traffic could be secured eventually by extension of Western Maryland lines into the Somerset fields, as well as others. Only last week Pres. Gray of Western Maryland, with a party of engineers, made a personal reconnaissance into the Somerset field, and is reported highly pleased with results of the trip.

Immediate accession of Consolidation Coal traffic for Western Maryland will, however, come from the company's properties in Maryland and West Virginia, at present accessible to Western Maryland. Evidences of this new traffic are expected to begin to show in Western Maryland's earnings before the close of this month. Fourteen million gross and five million net is the talk for next year.—"Boston News Bureau."

## Proposed Combine of Indiana-Illinois Operators

The most important move to consolidate coal interests in America has just been started in Chicago. If the negotiations are carried through as now planned, the final organization will amalgamate the bituminous coal interests of Indiana and Illinois. It is estimated that more than $700,000,000 will be involved in the deal. Represented in the proposed combine are the Rock Island interests, the Peabody companies, the Miami Coal Co., the Bogle Coal Mining Co., the Dering Coal Co., also the Clinton, Vandalia, Monon, Green Valley, Jackson Hill, Schirke, New Central, Sugar Valley, Coal Bluff, Clove Valley, United Fourth Vein and a number of other companies. Active in perfecting the plans are W. S. Bogle, Carl Scholz and John T. Connery.

The general idea of the combine is to form a merger whereby the coal producers will be afforded an improved system of selling. Most careful attention is being paid to all the legal phases of the matter, as those interested are determined that whatever final plans are developed shall be within the law and meet with the approval of federal statutes.

The reasons for this merger will be published in "Coal Age" next week.

# The Labor Situation

*SYNOPSIS—Not while the union has money will the eastern Ohio strike end. The union and the miners are united in that determination. The Gallagher amendment of the Ohio Assembly will practically wipe out the Green antiscreen bill. The strike near Fairmont, W. Va., ends as suddenly as it began. The Rockefeller Foundation may provide for the wants of the gunmen of the union in Trinidad, Colo.*

There are only two ways to end the Ohio strike within a reasonable time; either the operators or the miners must be compelled to make concessions. Neither side will willingly concede anything, and discussion is useless. The operators show their sense of right dealing by agreeing to arbitrate without reservations as to the arbitrators. The miners' representatives try to appear equally well disposed. They have deceived people several times with fair words relative to arbitration and discussion, but when any definite plan is broached, the representatives of the miners are unalterably opposed to it.

### Another Conference Fails

As we stated last week, the negotiations between the operators and the miners' representatives and Secretary of Labor Wilson failed to bring about a settlement. On Mar. 3 the union leaders returned to Ohio, for it developed that they had no power to act on a settlement and their parleying was merely an attempt to give the public the idea that they were open for argument.

When they returned to Ohio they called a conference and the miners showed again, as they have frequently shown before, that they are unalterably for 47c. per ton of machine-mined run-of-mine coal. It is useless for the operators to deny this fact, for it is clearly established. The officials of the union called a meeting at Bridgeport, Ohio, on Mar. 5. About a thousand miners appeared to attend the meeting and it was evident then that there was no hall large enough for such a crowd. So the meeting adjourned to the Auditorium in Wheeling, W. Va. A resolution was passed criticizing Senators Howard and Moore, of the counties of Harrison and Jefferson, for their vote in favor of the Gallagher amendment to the Green antiscreen law.

### Albasin Voices the Popular Demand

C. J. Albasin, president of the subdistrict on strike, made the following statement:

We are going to stick for 47c., immaterial of what the benefits might be. We have been able to pull through the winter and can certainly do so in warm weather. We condemn Senators Moore and Howard for supporting the Gallagher bill, no matter what the legislature may do with the measure. Such a law will only complicate matters. This strike cannot be settled by legislation. We have worked for many years to have a mine-run law passed, and now the senators from our two big mining counties are trying to beat the miners. There will be no compromise other than on the 47c. basis.

The reader will please note the words "immaterial of what the benefits might be." There are distinct benefits to be gained by a reasonable wage in Ohio with its assurances of steady work. A higher wage than that formerly obtaining would mean a larger measure of idleness than ever before in eastern Ohio.

### The Gallagher Amendment Is Popular

Whatever the miners and the union may think of the Green anti-screen law, the state senate of Ohio is almost unanimously disposed to give the miners and operators a chance to contract without reference to its provisions. The Gallagher amendment, passed by the state senate on Mar. 4, permits miners and operators to negotiate wage contracts on any basis they see fit and to disregard the mine-run provisions of the law. Where, however, they fail to agree the only basis on which a scale can be made is the mine-run plan.

The law thus remains, but it is for all practical purposes a dead letter when the amendment is duly signed. The emergency clause providing that the amendment, when passed by the assembly and signed by the governor, shall be immediately effective, was adopted by a vote of 24 to 8. Otherwise a referendum vote would have been necessary and a final decision would have been delayed till after the November election.

The discussion which preceded the vote could hardly be called a debate, as no strong opposition to the amendment developed. It is believed that the House of Representatives will adopt the amendment and that it may solve the situation in eastern Ohio. Many operators favor its passage, especially in the eastern Ohio district. Party lines were broken in the vote of the senate; 15 Republicans and 8 Democrats voted for it, and 4 Republicans and 5 Democrats against it. The leaders of both parties voted for the amendment.

### Ohio to Oust West Virginia Coal

As part of a campaign to increase the use of Ohio coal, Chairman Whitacre of the house committee on labor has undertaken to father a bill compelling all public institutions in the state to use Ohio coal exclusively. It is alleged that the Ohio University and the Athens State Hospital, both located at Athens, Ohio, almost within a stone's throw of coal mines, have been using West Virginia fuel.

Governor Willis, in a recent speech at Cleveland, Ohio, declared that business was suffering from excessive regulation and said he believed that new legislation should not be passed to further restrict the operations of commerce. He is thus in declared lack of sympathy with such legislation to regulate coal freight rates as has been introduced by Senator Vorheis, of Guernsey County, but it is believed that in this particular matter his opposition to business regulation will be overborne by the force of the arguments favoring low freight rates for coal. The railroad men say that the rates named are too low to permit the railroads to make a profit.

### No Allowance for Women and Children

The miners have been receiving $3 a week, 50c. additional where married and 25c. for each child. These additional payments have been stopped, but on Mar. 6 the matter was brought up at the Wheeling, W. Va., meeting and was satisfactorily adjusted. The men were notified at the meeting that the meager strike pay they were receiving might shortly be reduced, but the miners are in no relenting mood and voted to continue the strike "till death."

Arthur J. Morgan, owner of the Edgehill coal mine, north of Bellaire, Ohio, announced on Mar. 7 that he would accept the union scale of 47c. for machine-mined run-of-mine coal. The A. J. Morgan Coal Co. employs at the Edgehill mine about 100 men. It is easy to see that his secession from the operators' ranks is of little importance.

### The Strike of the Jamison Men Ends

The strike at the Jamison Coal & Coke Co.'s mines in Farmington, W. Va., is drawing to an end. On Mar. 1 about 325 men returned to work at mines Nos. 7, 8 and 9. On Mar. 2 the number at work increased to 755. Over 100 men were at one time locked in jail for participation in the riots in which Constable W. R. Riggs lost his life.

Negotiations are still proceeding between the subscale committee of the United Mine Workers of America and the New River coal operators at Cincinnati, Ohio. The contract between the parties expires on Mar. 31, and the miners ask for a 10 per cent. increase, the check-off and the short ton.

### Poverty in Colorado

The strike in Colorado has left much poverty in its train. The companies operating in that state had nearly all the men they needed when the strike came to an end. The Colorado Fuel & Iron Co. employed some of the strikers, but did not have places for the bulk of the men. Joe Rizzi, of Trinidad, wrote to John D. Rockefeller, Jr., appealing for relief for needy miners. Mr. Rockefeller replied to the chairman of the Chamber of Commerce of that town Feb. 25:

At my request, Mr. Welborn has had an investigation made and advises that Mr. Weitzel has reported to him that in conference with several representative citizens of Trinidad none of them could give the names of any former employees of the Colorado Fuel & Iron Co. in need of help. As you doubtless know, the company is seeking to do all it can for its former employees and their families.

The Trinidad Chamber of Commerce replied the following day, asking for help to "relieve the distress in this community among other than your former employees by enlarging the scope of the work being done by the local officials of your company."

### Kirchwey Was Right—The Rockefeller Foundation May Support Gunmen

Mr. Rockefeller replied that if the local authorities could not take care of the distress, "a situation would be presented which the Rockefeller Foundation might properly consider on representations from leading bodies and the governor of the state as to the extent of their inability to cope with the need." It is hardly probable that the state will do as suggested. It appears, however, that with the founders' good-will the Foundation may well aid in helping the gunmen of the union in the extremity which overpowers them, now that the union no longer supports them

# Editorials

## Trail-Hitting and Mine Safety

The movement to require strict temperance of the officials in the coal mines in Scranton, Penn., has its roots in the remarkable awakening to better living resulting from the recent religious campaign in Scranton.

Jenkin T. Reese, the mine inspector of the fourth anthracite district, in his annual report points out the increased tonnage per fatal accident and ascribes the improvement to the fact that "many of the miners have cut out booze and are now going to the nickelettes and concerts" instead of the saloon. He adds, "Many are trail-hitters and there is increased reading due to the war and this operates against the booze."

The men in the office and those in jeans are one in realizing that safety and efficiency demand that an end be made of alcoholism.

## Success

It is not difficult to sail high and maintain an even keel when skies are clear and breezes light, but it is a different matter when the storms and winds of troublous times are on us. In these days of world war, the men who can smile and show a cheery countenance are those who have built their business structures on a solid foundation. They are the ones who have foreseen rough weather and prepared for the squall.

It is just this lesson that strikes home to all of us at present and causes the publication of a real SUCCESS number of COAL AGE. This issue, as you have already been told, will appear April 3. Every reader and friend of the paper is specially requested to add his quota to the total matter that will be printed. The story may describe a man, a method or a machine. The only stipulation is that the facts of the description bear out conclusively the idea—success.

This particular issue of COAL AGE will be greatly enlarged, and we propose to make its contents so diversified, interesting and valuable that no one will be able to lay the paper aside until all of the articles have been read. If we accomplish this aim, the SUCCESS number itself will be a SUCCESS, and the men who read it will know more and be greater successes than before.

## Failure

It is a question in the minds of many men whether it is better to know what to do to attain success or to know what to avoid to escape failure. Perhaps a knowledge of both is the winning card. At any rate, we would like our readers, wherever it is possible, to submit a story for our SUCCESS number, telling how a man, a method or a machine has failed; what action or lack of action has brought on disaster.

It is through such knowledge that we all learn to avoid the pitfalls that beset our path, and if this can be done, we are well on our way to success.

What a lot of trouble and worry might have been avoided if John had only known that Tom had tried a certain scheme or followed a certain plan and failed. Talk about conservation! If we could only eliminate the duplication of failure by turning the bright rays of public attention on all great mistakes, a lasting benefit would accrue to humanity at large.

Therefore, if you can't tell us the story of a big success, write an account of the biggest failure you know about. The interest and value to the reader will be equally great in either instance.

Do it today.

## The Outlook on Ocean Freights

In event of the war being prolonged indefinitely it is clear that ocean freights will still be attractive to the colliers already engaged. Under these conditions the reserve stocks of coal all over the world will be depleted sufficiently to create an emergency demand for American coal whatever the freight, and the shippers having off-shore tonnage available will be relatively independent of the coastwise market. There are recent developments that give color to that prospect.

The other factor is the state of general business. The bottoms now withdrawn from the coast will still be considered surplus, if conditions are not improved over 1914. The crucial time will be Apr. 1 probably, when coasters are released from last season's contracts. If more go off-shore, and the increasing number of sailing vessels loading export cargoes seems to tend that way, then New England will have to do business with the coal operators on the best terms obtainable. If it is decided that these boats shall take their chance on the coast, and business doesn't improve, or the export demand doesn't materialize, then it will be for the shipper and the transportation owner to meet each other on common ground.

This is a vital matter to a good many West Virginia operators, and developments this spring are bound to be closely watched.

## Some Intimate Points on the South American Trade

The representative of one of the largest coal corporations in the country, who has just returned from a protracted visit to South America, has offered some interesting remarks on the coal situation there. Many of the points he covers have been repeatedly pointed out in these columns before, but there are other and more recent developments which have so far received little consideration.

Thus, for instance, in the matter of financing and arranging credits, the National City Bank of New York is proving a most important factor in the situation. This is a matter that has long been a stumbling block to the progress of American trade, our practice in this direction varying notably from that of European concerns, American operators having displayed an inflexible determination to have their own way in these matters. This finan-

cial house has been found extremely accommodating and too much credit cannot be given to its efforts to facilitate American trade.

The work of Mr. Barrett, of the Pan-American Union, is also most highly commended and recommended for hearty support. But, on the other hand, the work of the *attachés* of the American Commercial Service is proving ineffective and it is believed that this department leaves much to be desired.

It is also becoming clear that the opportunities for smaller concerns, with limited working capital, are at least questionable. Before a profitable business can be established, a considerable expenditure will be necessary; docks and bunkering facilities must be provided, while exhaustive tests of the American coal will be necessary in order to convince the buyers of its quality, and in addition to this, our operators are facing a competition with European producers of the bitterest kind, which cannot be lightly ignored. Obviously, these foreign companies will not tamely permit American coal producers to supersede them in these markets until they have exhausted every resource at their command.

To build up a satisfactory business we must send high-grade men, well informed in both a commercial and technical sense, and they should be able to speak the Spanish language. American commercial houses have already made some progress in the South American trade during the past five years, and there are still enormous possibilities for stronger concerns that are prepared to make a relatively heavy initial expenditure and approach the problem in a systematic and businesslike manner.

## Ueber Alles

On the fifth of March the New York section of the American Institute of Mining Engineers held a banquet, and, as after dinner speaker, G. O. Smith, director of the U. S. Geological Survey, discussed "The War's Opportunities to Make America Mineralogically Independent."

E. G. Spilsbury was chairman and he critically declared that he thought we should desire commercial rather than "mineralogical independence." He was, however, willing to be "shown." Mr. Smith is a forcible speaker when he is attacked. He is a trifle diffident, however, when his fighting blood is not aroused. So his speech, which he described as an "exciter" to larger electrical units, was not equal to what it would have been had it been a reply rather than a prelude.

Without saying anything to which the most squeamish of foreigners could take offense, Mr. Smith took a ground commonly regarded as patriotic and which is the cause of much bad feeling between nations. Clearly the aim of the United States should not be to undertake to do that for which it has no marked fitness.

The ideal of some people is to ship all kinds of minerals to all parts of the world and take none in return—except gold and silver, which are also minerals and which also we are well fitted to produce. It is obvious that we cannot succeed in sending everything abroad and taking nothing in return. All we should try to do is to mine here whatever, like coal, we can mine best and take in return readily whatever other peoples can mine or manufacture to most advantage.

We should feel when we see the foreigner with something we want like the man in a store who sees a gewgaw which he desires. He is glad, not sorry, it is there, and he figures out how he can buy it. But nationally we are not so built; we want to sell all the time and never buy, and we hope thus to assure ourselves of our overlordship over the rest of the world.

And we are not alone in believing that our self-interest lies in antagonism to all other people. It was a Scotchman with a strong accent who said at the banquet mentioned that we should not allow our phosphates to be exported and then lauded the least happy utterances of that recent bulletin of the Geological Survey which has excited unfavorable comment abroad and which can hardly be said to comport with our national dignity.

And that Scotchman is only one of many Britons who have just that "Ueber Alles" way about them that we also too often have. We stole the expression "Made in U. S. A." from Europe, only we made, of course, a trifling and obvious change. This evidence of insularity is Europe's and not ours, though in our way we have our faults. Where England gave free trade, we fostered a protective tariff. In fact we have placed this so high that a "Made in U. S. A." campaign seems somewhat superfluous as a device to misdirect commerce.

All coal and other trade should be free not only of tariff, as this paper has often urged, but of sentiment. If there is any coal in Canada which serves our needs for certain purposes in certain places, let us by all means use it. Unfortunately for Canada, the Canadian coal along the sea coast must compete with the very best West Virginia and central Pennsylvania coals, which are as high as any in the world in evaporative efficiency, far superior to the coals of western Pennsylvania and Ohio—fuels with which Central Canada is supplied by the United States.

This is what makes competition in New England peculiarly difficult to Canadian operators. The good coals of Canada must compete with the superlative coals of the United States. The Canadian coal should, however, have some compensatory transportation advantages, provided the freight rates of Canada are as reasonable as our own. In the central part of the Dominion the quality is more equal, and the shipping facilities being well balanced, it is strange that Canada allows western Pennsylvania to carry off so much desirable trade.

In the West let not the Canadian worry. So long as G. O. Smith has the valuing of the lands, there is no probability of a great mineral development which will seriously compete with the Canadian minerals in British Columbia, Alberta and Saskatchewan. If, however, such a development took place, those provinces of the Dominion could not fail to profit.

After all, it is a folly to look upon the nations as rivals. The individuals in the same trade may be, but the nations are not. That for which a nation or part of a nation has no aptitude it should not strive to perform. There is certainly no patriotism in such a course. For no nation will ever prosper if it insists on "doing stunts," mineralogical or manufacturing, simply to show that such things are possible if it puts enough time, effort and capital into them and shows a necessary indifference as to the profits to be derived. For after all the nation lives for the welfare of its citizens and not *vice versa*.

# Sociological Department

## Education in Colorado Fuel & Iron Co. Villages

*SYNOPSIS—The schools have found some difficulty in combating the general apathy. Nevertheless, much good institutional work is being done with the help of the sociological department. The opportunities for education are excellent for those who desire to embrace them.*

The sociological work of the Colorado Fuel & Iron Co. is not so markedly developed in its schools for adolescent children as in its kindergartens. But most large corporations outside Cincinnati, Ohio; York, Penn., and Hammond, Ind.,* do absolutely nothing in the matter of promoting the education of children, regarding this with reason as the work of the school board.

### Why Operators Have to Interest Themselves in Schools

In mine villages, however, the coal company, opening its mines often during the course of a brief year and anxious to obtain working men who are mostly married and have children, is obliged to urge, and sometimes to provide, the necessary schoolhouse accommodation. From the very first, therefore, a relation has existed between operating companies and school boards in the coal regions.

It has been found also in mixed mine and farming regions that the period of the school term is all too short—the farmers being desirous of saving the money they would have to spend in providing full-term education, the teachers being drawn from the farms and being anxious to aid in the farm work during the busy seasons, and the farmers themselves needing, or believing that they need, the help of both children and teachers at a time when a few hours' work may mean the making or the marring of the crop.

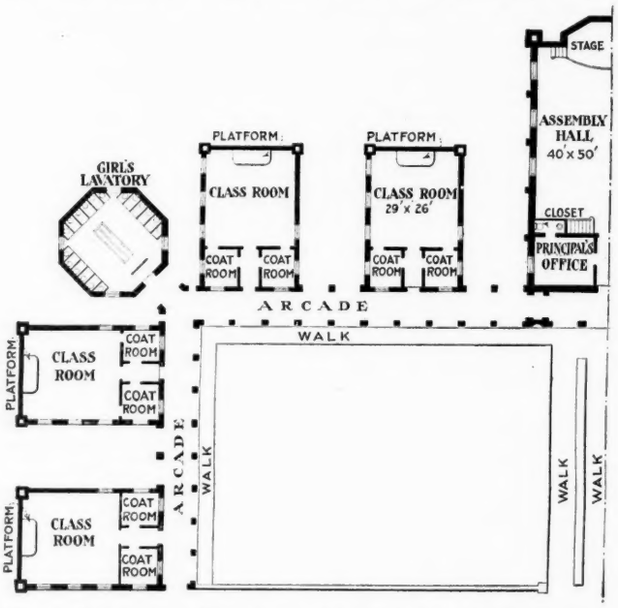
This being the case, the corporations often have difficulty in securing the longer terms of school customary in cities and often obtain the necessary funds by an assessment from the miners, which the latter voluntarily agree to pay. In other cases the company has to supply by a special appropriation the money needed for the extended period of school. Often, also, the corporation may have to erect the schoolhouse.

### Schools and So Called Politics

This relation appears menacing to socialists and others who fear that the goodwill of the teachers toward the company may influence them in their instruction. The menace is perhaps not wholly a daydream. It is always a mistake and a lowering of one's manhood to let another do for one what one should do for one's self; but unfortunately there has been little disposition on the part of the body politic in the mining villages to do their part and manifestly little ability to perform it even if the disposition were present—so the difficulty must inevitably continue to exist. It is only part of the general menace which foreign tongues and alien illiteracy are constantly placing upon us.

The Colorado Fuel & Iron Co. has endeavored to develop the public schools wherever it has planted its villages. The school boards have been assisted in obtaining good teachers. Architects' plans have been loaned to school districts preparing to build.

At first, when the communities are too small to warrant the erection of a schoolhouse, the children have been transported to some neighboring village at the expense of the company. Thus the Cuatro children were carried to Tercio and back daily till Cuatro was provided with a school. Occasionally where funds were not otherwise available, as at Madrid, N. M., the teacher has been placed on the payroll of the corporation to prevent the closing of the schools.




Half Plan of a Block of One-Room Schoolhouses Exemplifying the Pueblo Plan

The room opposite the principal's office in the assembly hall is to be used by teachers

### No Lack of Schools at Mine Villages

But though care is taken to provide schools, they are not as well attended as they should be. There is not a sufficiently general desire on the part of the parents to educate their children. This is not due to a deficiency in the teachers, who are claimed to be even more intelligent and better paid than those in the adjoining states.

The buildings are all new and attractive frame, brick or cement structures, admirably adapted for their purposes. Those at Pictou, Berwind-Tabasco, Rouse, Sopris, Segundo, Primero and Tercio are two stories high, with attractive, cheery classrooms, a kindergarten room and a hall for lectures, concerts and the social gatherings of the community.

*See article on "The Half-Time System" in Coal Age, Vol. 3, pp. 579-580.

In the schoolyards of several of these schools play apparatus has been installed, consisting of swings, teeters, rings and horizontal bars. The interior of the schools is hard finished throughout; the walls are adorned with good pictures, and each child has its individual desk. Where children live too far from the school building to walk, a conveyance calls for them at their homes in the morning and takes them home from school in the afternoon.

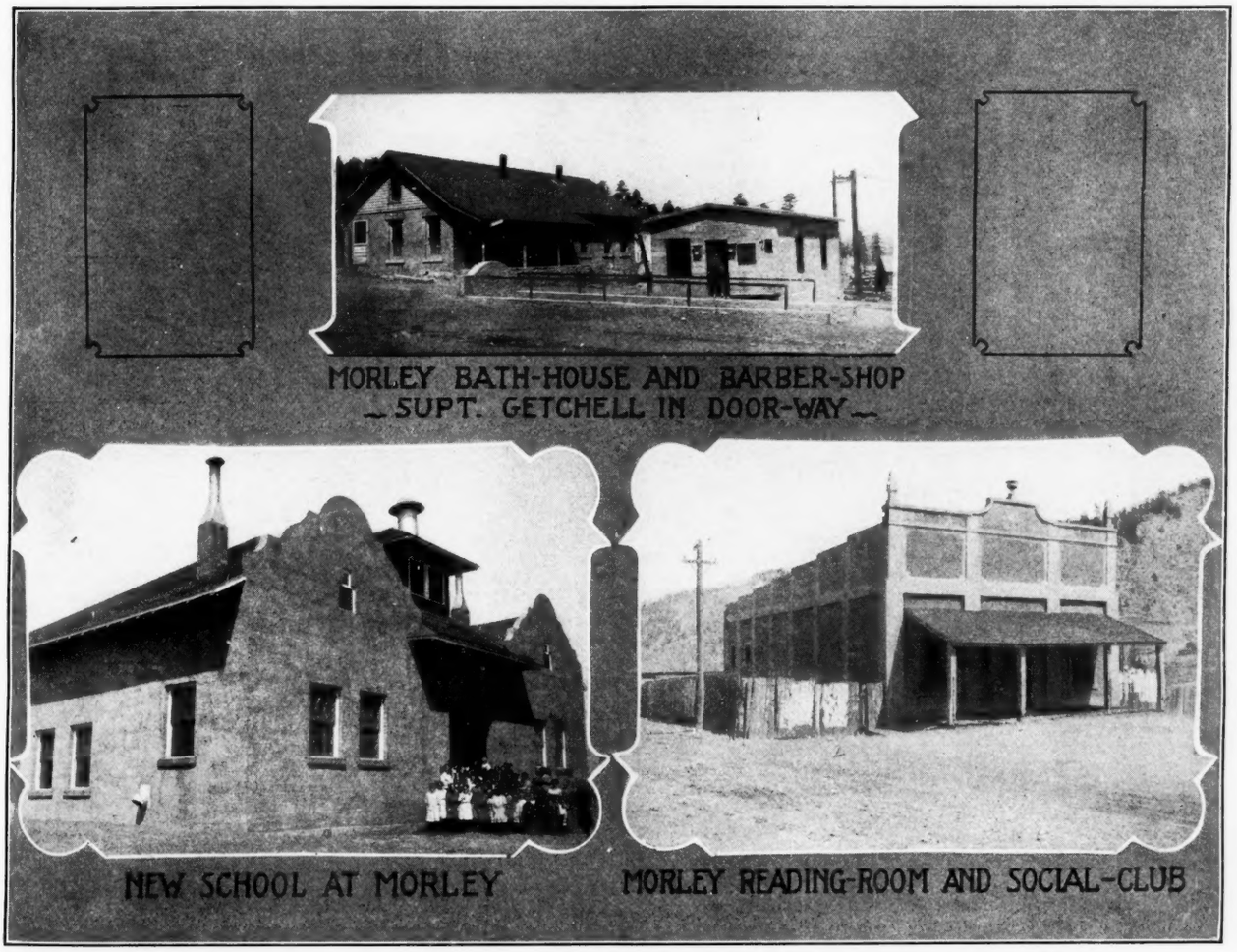
Several of the school boards have established teachers' houses, following the practice of the sociological department of the Colorado Fuel & Iron Co. in dealing with its kindergarten teachers, and have also followed that lead in providing Christmas presents for the children.

The surgeons resident in the mine villages have used the schools for monthly talks on hygiene to the benefit of both teachers and pupils. The stereopticon has been used to assist in this work.

### The Trip to the St. Louis Exposition

In 1904 all the teachers in the company's villages, both public-school and kindergarten instructors, were invited by the sociological department to visit the World's Fair at St. Louis, that they might study the educational and sociological exhibits. This took the place of the regular summer course for teachers held at Pueblo. The teachers agreed, in return for their transportation, to remain in St. Louis not less than two weeks, to visit the educational exhibit at least three mornings each week under the direction of members of the department, to submit to the department a thesis of two thousand or more words on some phase of the educational or sociological exhibit, and to return to teach at one of the Colorado Fuel & Iron Co.'s villages during the following year. For approximately three weeks about 20 teachers availed themselves of the opportunity.

The teachers wrote their theses on regulation and inspection of factories and mines; the insurance of the aged and the invalided; the erection of improved dwellings by employers, by individuals and by public authorities; general efforts for betterment of housing conditions; legal regulation and public management of the liquor trade; efforts for lessening intemperance; social settlements; humane societies; church and other institutional work; German kindergartens and public schools; training and certification of teachers; value of manual training in school work; plans and models for small schools; education of negroes; summer schools; school furniture and appliances; day nurseries; vacation schools; Japanese kindergartens and public schools; pay of school teachers; manual training; and Indian basketry in public schools.




Some of the Buildings at Morley, Las Animas County, Colo., near Trinidad. Morley Is One of the Colorado Fuel & Iron Co.'s Villages

In the 1903-1904 report, which was quoted so extensively in a previous article, occur the following remarks on the circulating libraries and social-industrial features in the schools:

### Circulating Libraries

The circulating library is no longer an experiment, for the books have become increasingly popular and are more widely read than ever before. Especially is this true of the juvenile books, of which we have altogether too few. Here again we have found a point of contact between our department and the public schools, for the teachers have taken a great interest in these libraries and in several instances have offered prizes for the most intelligent reviews of the books read by the children. In one camp there was always a long line of children in waiting when the hour arrived for the exchanging of books. Of the 45 boxes comprising the Colorado Fuel & Iron Co.'s Circulating Library, 29 are devoted to English books for adults; 12 contain juvenile works and 4 contain works in the Italian language.

The increased circulation of the books has been very gratifying, averaging about 1200 books per quarter. The banner stations were Madrid, N. M., and the Minnequa hospital.

The most serious difficulty that the department has had to contend with has been the failure of some of the libraries to move promptly. In some instances the condition of the stage-roads at certain seasons of the year is responsible for this, but often it is due to the failure on the part of readers to return books promptly. Time and practice will no doubt satisfactorily solve this problem.

### Mounted Photographs

The department has a collection of mounted photographs composing 30 sets of 12 pictures, each arranged according to artist, school or type. Each set has its own wooden shipping-case and is provided with a typewritten description or interpretation of all the pictures contained in it, together with a brief survey of the artist, school or type. Following is a list of the pictures in set No. 21, composed of Spanish paintings, which we give as a fair example:

Murillo—"Immaculate Conception," "Virgin of Seville," "Birth of the Virgin," "Madonna and Child," Flight Into Egypt," "Beggar Boy" and "Holy Family of the Bird."

Velasquez—"Portrait of the Artist," "Reunion of the Artists," "Philip IV of Spain," "Infanta Maria Theresa" and "Infanta Marguerite."

These groups of photographs are loaned to the public schools in the camps and moved from time to time.

### Framed Pictures and Casts

The department also has a small fund given by interested parties for the purchase of casts and framed pictures with which to adorn the interior of the school buildings. Already several hundred dollars has been received and expended for this purpose. An effort has been made to keep in mind the needs and requirements of public schools and kindergartens.

### Boys' and Girls' Social Clubs

Wherever the kindergarten teachers are located, there you will find groups of boys and girls organized for social and recreative purposes and still other groups whose aim is industrial education. For the kindergarten teachers are in a true sense social-settlement workers and conduct in the afternoons clubs and classes, mothers' meetings and all those forms of social effort which have become a recognized form of settlement-work.

Games and stories are still the source of interest for the smaller groups; while for the older boys and girls club-swinging, dancing, physical culture, basketball and target shooting form the chief attractions. Light refreshments also form a frequent innovation at the club meetings.

Special mention should be made of the physical-culture classes at Pictou, under Miss Mary Mason, the basketball teams at Starkville, under Miss Gertrude Heenan, and the Beaman Club at Tercio, under Miss Angie Gilbert. The last-named club has grown from a purely social to a literary organization, officered by its own members and conducted on strictly parliamentary lines. At the Thanksgiving dinner given by the club the toasts and speeches would have done credit to persons of maturer years.

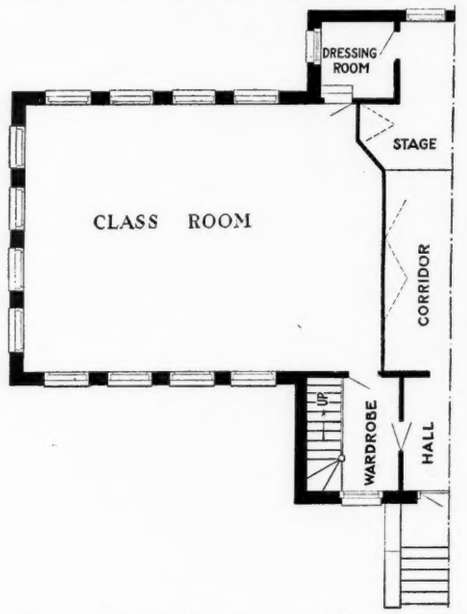
The club is now editing and publishing a little bimonthly newspaper, the "Tercio News." During the school year the teachers aided the children in this work; Miss Irene Haskell, of Tercio, was their helper and adviser during the summer. The children now have their own printing-press and hope soon to be able to do their own presswork. Thus the social club is developing into an industrial class. The basketball and physical-culture clubs were crowded, and during the year several excellent entertainments and exhibitions were given—in some cases free, in others to raise money for apparatus or uniforms.

### Industrial Classes

One of the chief objects of the normal and industrial school conducted during the summer of 1903 by the department in its school building at Pueblo was that each of our kindergarten teachers should receive adequate instruction in cooking, sewing and basketry for the purpose of teaching these subjects in the camps.

The success of the experiment has been gratifying, for not only has the department been saved the salaries of two special teachers of sewing and domestic science, but the classes in these branches have been much better attended because of the greater confidence the camp residents have in the kindergar achers, who are with them all through the school year. Especially is this true concerning the foreign residents. A teacher who comes to a camp for a few weeks' course and then is gone again fails to gain the confidence and coöperation of the people.

The most noticeable feature of the year's work along industrial lines has been the increase both in the attendance and in the interest. Last September at the beginning of the school year, before our teachers could begin to organize their clubs and classes, the children came urging them to start the work and begging for admission.




Half Plan, Ground Floor of a Modern School Building with Rooms Lighted from Three Sides. One of the Alternative Plans Advocated by Dr. R. W. Corwin

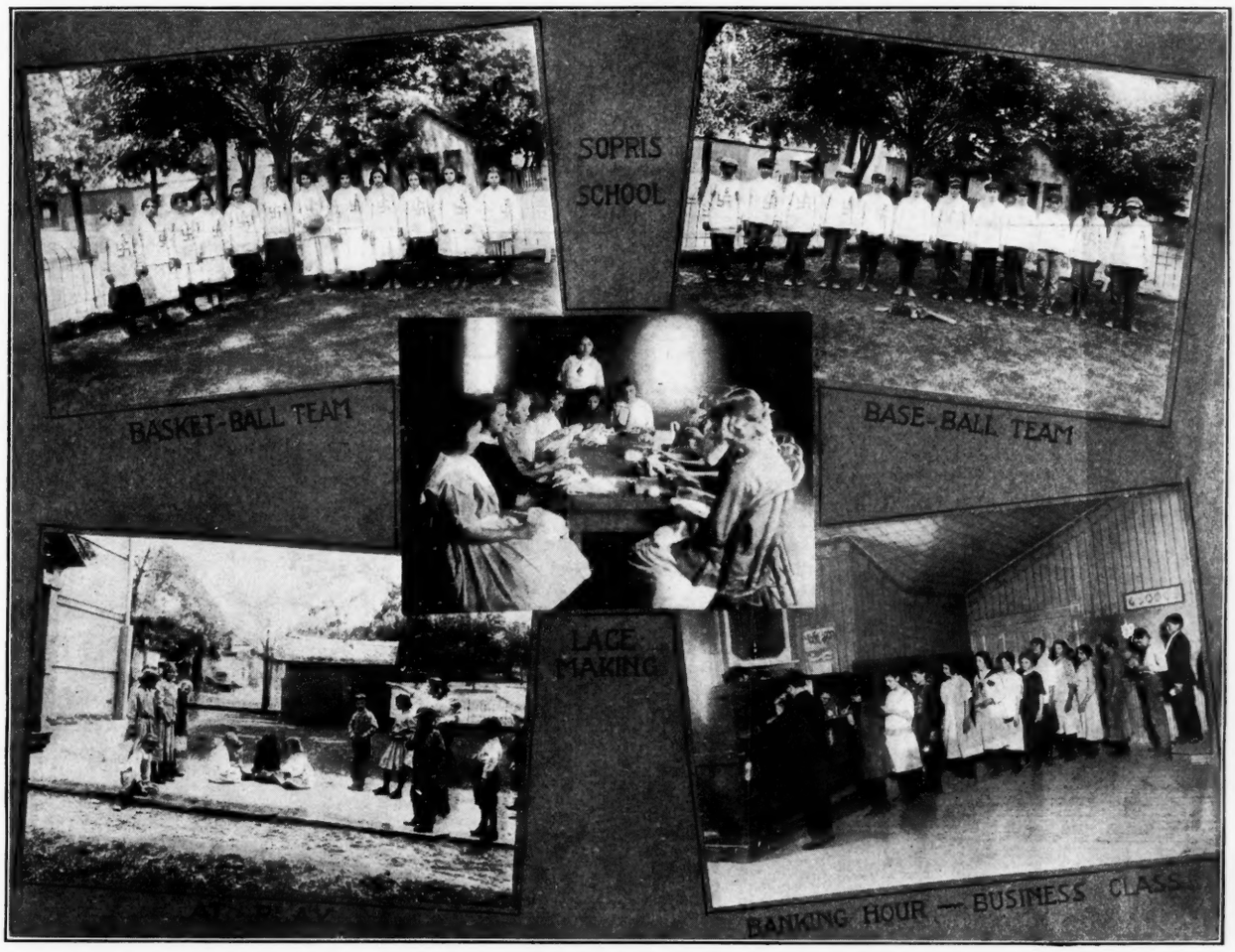
In some of the camps the classes have had to be divided as they were too large for the teacher to handle. Especially has this been true of the sewing, which has been very popular. The girls have learned to do fine darning, stitching, hemming and embroidery, and many of them are making undergarments. The coming year they will be taught to make skirts, shirtwaists and dresses. Raffia classes have also been popular, probably because "in the spring a young maid's fancy lightly turns to thoughts of hats." Some of these hats were very pretty and original in design and handsome enough to be worn as "best" all summer.

Some of the boys in the manual-training classes have made their own looms and are weaving small—but pretty and useful rugs. Their heavy work-aprons of blue denim are also the work of their own hands. At Pictou the boys carved match-safes, penracks, picture-frames and similar articles, samples of which form part of the sociological exhibit at the World's Fair at St. Louis.

The strike has made little difference in any of the club activities; and in the cases of the older boys thrown out of work, many have attended the afternoon clubs, thus swelling the enrollment.

### Cooking

Classes in cooking have been conducted by several of the teachers as part of the work of the girls' clubs and in connection with the mothers' meetings. The sociological houses




SIDE LIGHTS ON THE SCHOOL TRAINING IN THE COLORADO FUEL & IRON CO.'S MINING TOWNS

were the centers of this work, and in each case the object was to teach simple cooking with ordinary utensils—the proper preparation of vegetables, meats, eggs and fruits. Lessons on the proper care of the cupboard, on housekeeping and on the duties of the housekeeper were also given. The "inner woman" has by no means been neglected.

### CLUBS FOR ADULTS

In addition to sewing and cooking classes for adults, flourishing clubs of women, for the study of child-life or for basket-making, have been maintained with especial success at Engleville, Sopris, Rouse, Primero and Tercio. The large ladies' basketry class at Rouse calls for special mention because of the superior excellence of the finished product. Some of these baskets were sent to the World's Fair with our exhibit, and those who made a careful comparison felt that they were quite as fine as any in the Educational Building.

### PUEBLO NORMAL AND INDUSTRIAL SCHOOL

The normal course, under the direction of Prof. J. F. Keating, held at our industrial-school building during the summer of 1903, was highly successful. There were 67 teachers in attendance from Colorado and the adjoining states. In addition to the regular normal course, classes were conducted in sociology, domestic science, physical-culture, etc. Peculiarly attractive was the course in freehand drawing offered by Mrs. E. Scofield Wright, and her studio and exhibit of ceramics, water-colors and burnt-wood designs are a constant delight to visitors.

She it was who conceived and prepared the dainty green and gilt school pins which the normal students wear. A neat certificate of the work done was given at the conclusion of the course, and this was accepted by the public-school authorities in lieu of an examination in the branches covered. The dormitory capacity of the school building was taxed to the utmost. The efficiency of our camp school teachers was greatly increased by this special training, and now the employment of special teachers of domestic science is no longer needed.

The course for the summer of 1904 was given in St. Louis in the Educational and Social Economy Building at the Louisiana Purchase Exposition and has been referred to elsewhere in this report.

In the wintertime the normal school building is used as a dormitory and social center for steelworkers and others who desire to avail themselves of its privileges. A night school for steelworkers was conducted in the large rooms in the basement and was well patronized until the Christmas holidays.

### INDUSTRIAL HOME

This feature of the work at the "old hospital building," while perhaps the most important that could engage the attention of the department, having for its object the care of employees who have been seriously injured or have grown old in the service of the company, is still in the experimental stage.

The manufacture of mattresses carried on during a part of the year has been given up, owing to the fact that the work has proved too heavy for the men now at the home. It is probable that several lines of work will have to be introduced adapted to men of different degrees of infirmity. Several forms of light occupation are now under consideration, and this fall one or two of them will be tried with the men now under our care.

Of course it is not expected that this branch of the work will be self-supporting, but enough will be realized to make the men feel that they are at least earning something and are not dependent on charity. The industrial school was represented at the State Fair by an interesting display of canned fruits and jellies and also by mattresses made by a blind man at the school.

### LECTURES AND ENTERTAINMENTS

The need of popular lectures and entertainments in the camps was felt the past winter much more than usual, due to the fact that employees were compelled to remain in camp for fear of violence from strikers. They were thus shut off

from outside entertainment in nearby towns. Fortunately the department was in a position to furnish the necessary social life in good measure. The lecture season opened with a series of stereopticon lectures given by Charles A. Payne, of Milwaukee, Wis., the first being entitled, "A Trip Half Way Round the World."

In addition to the lectures delivered monthly to the school children by the camp surgeons, several of these physicians have delivered evening lectures for adults, the most popular being those of Dr. T. D. Baird at Pictou. At the close of these lectures a social hour always followed, during which light refreshments were served. No entertainments in Pictou draw so well as Dr. Baird's popular evening lectures. We wish more of the local surgeons would adopt Dr. Baird's plan in this regard.

The department owns two stereopticon lanterns and has access to nearly two thousand lantern slides, covering a wide range of subjects, and these were in almost constant use all winter. Over forty lectures were delivered by members of the department in addition to those by the local surgeons in the camps in the southern part of Colorado.

Of a more popular nature were the socials, musicales, Washington's Birthday parties, Japanese festivals, drills, basketball contests and amateur theatricals given under the leadership of members of the department.

But doubtless the most popular entertainments given last winter were those at Primero, under the direction of Louis Smith, the mine clerk, and of Will Chamberlain, of the Denver office, in which only home talent took part. Under their able direction several original sketches were produced and some excellent talent developed. The schoolhouse theater was always taxed to the limit at these entertainments.

Dances were of course popular all winter, and of almost weekly occurrence. Perhaps nothing is so enjoyed in a mining camp as a good social dance, especially before people have begun to get wearied.

### Some Other Studies in the Art of Living

Many are the activities in connection with the schools, which lack of room compels us to overlook or pass over hastily. At Tercio the children have been taught pyrography. In some of the schools housekeeping classes have been held, in which fire-building, table-setting, dishwashing, bedmaking, sweeping, dusting, scrubbing, washing and ironing and, more important yet, the care of the baby, have been taught. In connection with this the scholars have been instructed in the making of towels, dust cloths, caps, aprons, napkin rings and similar articles.

A large club of boys at Engle has been taught weaving, and they have made large rugs for the floor as well as their own looms and working aprons. Other boys at Sopris have been trained in the use of Indian clubs and roller skates. Other groups of boys have engaged in chorus singing, basketry and making Venetian ironwork. In the Rouse schoolhouse electric light and attractive stage scenery have been installed, and entertainments of an elaborate order are possible.

The night schools for teaching English to foreigners have not been very successful, but attempts to maintain these have been made everywhere.

### The "Pueblo Idea"

The sociological department is continually endeavoring to raise the standard of the public-school buildings and is anxious to introduce what is known as the "Pueblo idea" in schoolhouses. Of course, facing the fact that most of the buildings were completed before the "idea" originated, the opportunity for such changes no longer presents itself frequently. At a new camp, however, known as Katchina, a commencement has been made.

The idea is to put each schoolroom in a building of its own instead of building all the elements into one common edifice. The introduction of such a scheme is the more feasible in a mine village where land is comparatively cheap. The reasons for the "Pueblo idea" are many.

### Why Overcrowd in the Country?

1. The number of schoolrooms may be made always to meet the demand, which is not the case with a building of many rooms. The many-room building is usually ahead or behind the needs of the district. There are vacant rooms intended for future requirements, or crowded rooms, waiting for the schoolboard to build. The plan suggested admits of erecting a building or room when there is need for it, hence there is no room unused and none overcrowded.
2. When several districts are crying for more room and the school treasury is low, the school board can accommodate each district at least cost.
3. It is cheaper than any other plan.
4. There is less waste room as there are no halls or stairs.
5. There is less chance of fire.
6. In case of fire there is less probability of loss of life or property or damage by water.
7. There is no particular need of fire drill with its nervous strain on certain children.
8. The danger to pupils in case of fire is reduced to a minimum.
9. Light may be obtained from any direction. The object of universally diffused light in a schoolroom is especially for the purpose of giving the left-handed child a chance equal to one of more normal habit. The one-sided lighting of a room may be perfect for the right-handed child, but how about the 3, 5 or 8 per cent. of children who are left-handed? High windows allow space for blackboard drawings or pictures on all sides of the room. If the building is located so that there is objectionably strong light from the east or west at certain times of day, it can be easily overcome by frosting the windows through which the strong light enters. If the windows are hinged at the bottom and the top swung into the room, ventilation is made most satisfactory and causes no drafts.
10. Ventilation may be obtained from all directions. As one of the teachers remarked, "Fifty pupils scarcely vitiate the air in the least." Not only is the sanitation of the multiple-room building objectionable, but often criminal.
11. There are no large hallways to receive dirt from the shoes of all the pupils.
12. Less work for the janitor.
13. No sweeping of dust from one floor down upon another.
14. No steps or banisters to clean.
15. No stairs to climb up or fall down. This is a relief to the small child and of vital importance to the young girl.
16. No noise from the passing classes.
17. It is easier for the principal to supervise grounds and rooms on this plan.
18. The teacher finds the discipline of her class both in the room and on the playground easier.
19. There is greater field for individuality on the part of both teacher and pupil.
20. A five-minute recess may be taken outdoors at any time without disturbing other classes.
21. The homelike atmosphere which may pervade the one-room building is not possible in the larger structure.

## Co-operation

We want to interest all of the readers of the sociological department of Coal Age in the special SUCCESS number of this paper, which will be published Apr. 3. Doubtless you have already read some of the brief announcements we have made with reference to this particular issue, but we are not certain that all of you understand that this SUCCESS number will cover every problem and every phase of coal mining concerning which a real SUCCESS story can be written. All kinds of sociological work, whether it pertains to training in first-aid or to night schools, or to miners' houses and gardens, or anything else of a similar nature, will come in for its share of public notice. Ever so many coal companies have accomplished welfare work of a most beneficial nature, and all such instances should be properly described in our SUCCESS issue. Get busy at once and send us the story of the particular work your company has carried on.

# Discussion By Readers

## Recognition of Bravery

*Letter No. 3*—The suggestion of COAL AGE, made in its issue of Jan. 16, p. 109, in reference to the adequate and tangible recognition of the heroic services of many mine workers who, in times of danger, are wont to rise to a supreme degree of courage in the attempt to rescue fellow workers, certainly deserves the hearty approval and support of all true-minded men.

While I heartily indorse such a movement, I cannot agree with the statement made by I. R. Packard, COAL AGE, Feb. 27, p. 383, to the effect that "such recognition would go far toward increasing the efficiency of rescue work," etc. I know too well the spirit of resolute self-sacrifice that animates the rescue worker to harbor, for a second, the idea that, in a moment of dire peril to his fellow worker, a miner would waste a thought on either the mercenary reward or the empty plaudits of hero worshipers that he might gain by his act.

To the mine worker whose every faculty is taxed to its capacity in time of peril, there is but one subconscious, unformulated thought that, perhaps, a human life may be saved or a human service rendered. It is not given to every man to be able, at will, to master his fear and screw up his courage to the sticking point that will enable him to save another's life at the risk of his own. To those who possess such masterful self-control, due recognition of their act should be awarded as a token that an appreciative people acknowledge their indebtedness to his bravery.

I feel that the bestowal of this recognition should be for no other reason than the all-sufficient one that it is eminently right and just that such heroic self-abnegation should be publicly recognized, not to say rewarded. It must be acknowledged, however, that human nature is so constituted that such recognition of a brave act would not be without its practical effect. The records of the early history of our own states as well as those of other countries prove that many acts of chivalry and heroism were prompted purely by the spirit of *noblesse oblige,* which interpreted is, "Upon a gentlemen certain things devolve." It is true, also, that in time of disaster a publicly recognized hero would feel it incumbent on him to act up to his acquired reputation for bravery.

I want to suggest that recognition of bravery should not be bestowed too freely, but only after the most careful investigation has revealed the merit of the act or service performed. Such a safeguard is necessary to avoid the cheapening of the award in the eyes of the public.

It is evident at once that the most difficult feature, in considering the means and methods to be employed in providing a recognition of bravery that will be void of ostentation, is the finding of someone willing to take the initiative and organize a suitable *foundation* devoted to that purpose. The thought comes to me, Why could not COAL AGE, as the leading American periodical devoted exclusively to coal mining, foster this movement, which it has had the honor to initiate by suggestion? The fund required as a foundation for the purpose need not be large—better that it should not be very large, as the most suitable recognition would probably take the form of an inexpensive medal. I would suggest that the fund set aside for such purpose could be known as the "Coal Age Hero Foundation," or some other appropriate title.

The administration of the fund and the granting of awards could be placed in the hands of a general committee, while advisory committees could be selected in each mining district. Such advisory committees could be composed of five members of high reputation and unquestioned integrity. It would be their duty to make recommendations for awards in their particular districts, to be acted upon and approved by the general committee.

I shall be most glad to read the opinions of the many COAL AGE readers in regard to these suggestions.

FLAT TOP ENGINEER.

Crumpler, W. Va.

## The Formation of a Flame Cap

I was much interested in the inquiry of W. H. Moore that appeared in COAL AGE, Jan. 30, p. 220, and the reply appended by the editor. Mr. Moore draws attention to the flame cap formed in pure air containing no gas when a lamp burning gasoline or naphtha is used to make the test.

I might state that I have had quite an experience with lamps of this type, and have also noticed the same phenomenon. I have called this a "fuel cap." As I have observed it, the cap is hardly perceptible, except the lamp has become somewhat heated, when the fuel cap becomes very plainly discernible. This cap is of a much brighter color than one formed by the presence of marsh gas ($CH_4$) or the ordinary firedamp mixtures that occur in mines.

In this connection, I desire to relate, briefly, several experiences I have had with such false flame caps and to say that the observations made by myself in company with others have been such as to confirm my opinion that such caps have often been mistaken for gas caps.

In one instance, while superintendent of the International Coal & Coke Co.'s mines at Coleman, Alberta, Can., the fan ventilating the mine was stopped about 6:15 a.m., owing to a slight accident to the generator in the power house. The repairs were quickly made and the fan was again running, at 6:45 a.m. Although the firebosses had previously completed their work and reported the mine as safe, the stoppage of the fan for one-half hour made it necessary to repeat the inspection before permitting the workmen to enter the mine.

To expedite this work, I deputized a number of competent and certificated men to make this second examination, giving to each a small separate district to examine and report upon. As a result, all parts of the mine were soon reported clear of gas and safe, except the in-

side district of No. 2 seam, where the fireboss who made the inspection stated that he got a cap on the flame of his lamp, at a point possibly 1000 ft. from the face of the main-intake entry. He stated that he also found the same conditions on the counter-entry.

I was much surprised at this report, since the fireboss who examined the adjacent section on the return side had not reported any gas and stated that the air current was traveling normally. In view of this fact, I concluded that a trap door had been set open between the intake and return, thereby short-circuiting the air at that point. Further inquiry, however, showed that this was not the case and, as the mine was well timbered, it could not be supposed that a heavy fall of roof had occurred to create such a condition.

To solve the mystery, I took a safety lamp and, in company with the fireboss who had examined this section, hurried into the mine. We proceeded cautiously and inspected the air current at intervals, both on the intake and return air courses but found no trace of gas whatever. We concluded that the cap previously observed was a fuel cap caused by the evaporation of the gasoline in the lamp, which had become somewhat heated in the examination. A further examination of all the pitch workings of the two inside districts showed them to be absolutely free of gas. There were no roof falls and the mine was in perfect condition.

A similar instance occurred while I was developing a property for the Columbia Coal & Coke Co., at Coalmont, B. C., Can. Two practical coal-mining men paid a visit to the mine and were accompanied through the workings by the general manager and myself. At the face of the main-intake entry, one of the gentlemen raised his lamp (which was a naphtha-burning lamp of approved type) to the roof to test the place for gas. On carefully pulling down his flame as low as possible, he detected a small cap surmounting the flame and called my attention to it, remarking that there was a small percentage of gas present at that point. Being confident that there could be no gas in the place, I assured him that the cap he saw was a fuel cap and offered to prove this assertion by getting the same cap out in the main rock tunnel that formed the intake-air course for the mine and where no gas could possibly be present. This we did to the satisfaction of all.

I heartily agree with the opinion that has frequently been advanced by COAL AGE that such a cap is formed on the flame of a naphtha-burning lamp in pure air, owing to the vaporization of the volatile oil. The heating of the lamp may slightly expand the wick tube, besides rapidly increasing the vaporization of the oil. The effect is greatly increased, also, by a small-sized wick. Again, the absorbent cotton in the oil vessel is sometimes allowed to get dirty and gummed in which condition it does not absorb the gasoline, which retains its liquid form and is vaporized more easily. The combustion chamber of the lamp then becomes filled with a mixture that will show a small percentage of gas. I have found that this fuel cap is always of a maximum size immediately after drawing down the flame from normal when preparing to make a test; but, after a few minutes, its size is gradually reduced. I shall be glad to hear from other readers, in reference to their experience in the same line.

J. W. POWELL.

Windham, Mont.

## Drying Washed Coal

*Letter No. 6*—Referring to the article by F. E. Butcher on the subject of Drying Washed Coal, COAL AGE, Feb. 20, p. 325, in which he alludes to the four centrifugal driers his company installed at Steelton, I desire to offer the following notes on the performance of these machines. These are not, however, as complete as it will be possible to give some two or three months hence.

We have operated three of the driers almost continuously, 10 hr. per day, for just about one year. In that time we have made some radical alterations in the drier-accessory equipment as well as in the driers themselves. The original equipment was as follows: The primary-washing outfit consisted of three units, each unit being composed of two double-compartment jigs, one centrifugal drier and three settling cones, 11 ft. 10 in. in diameter and about 9 ft. in height. At the overflow of each jig is a dewatering screen over which the washed coal passes. A large amount of the water and a considerable amount of fine coal pass through the dewatering screens and are conducted to a pump sump, while the coarse coal and about an equal portion of the water pass over the screens and go directly to the drier. The water thrown off by the drier together with considerable fine coal that gets away through the screen plates in the driers is also conducted to the pump sump. All of the water and fine coal in this sump is delivered by a centrifugal pump to the three settling cones. The sludge coal is drawn off at the point of the cone and conducted to the drier, entering the same receiving hopper as the coarse coal from the jigs. The overflow water from the cones is returned to the jigs.

As the best coke-oven results are obtained when the moisture content of the coal is nearly constant, the attempt was made to draw the cone sludge constantly, as nearly as possible, and with the above arrangement we averaged about 10 per cent. of moisture in the product of the three driers. The overflow water from the cones carried from 5 to 9 per cent. of solids or coal, and this resulted in "hutch product" from the jigs. With no cone sludge delivered to the driers, the power consumption of each drier was from 20 to 25 hp. and the moisture content of the drier product averaged about 7.5 per cent. Upon delivery of the cone sludge, the power consumption varied from 40 to 55 hp. From six to ten 75-amp. fuses were frequently blown out in a day. The centrifugal pump handling the water and fine coal from the sump to the cones, in each unit, consumed 15 hp.

In regard to repairs, we now have drier screens that will handle from 10,000 to 15,000 tons of coal before requiring to be replaced. The eight scraper blades in each drier must be replaced about once a month, but the adjustable scrapers installed give a much longer life before entire replacement is necessary. The rotor casting supporting the scrapers requires replacement in about one year. The same is true of the cast-iron spider supporting the screen basket. We are making these replacements at the present time. Ball bearings and miter gears require replacement about every six months but we have altered the machines and are obtaining better results at present. The pump impellers require replacement in from 60 to 90 days; the pump casings every four to six months. The piping from the pump to the cones cuts through in about eight months. The control gates or valves on the cones had to

be replaced in four months and the cone body cut through in spots, in six months. The loss of fine coal in the water leaving the plant averaged about 7 per cent. of the raw-coal input.

The cones and all of the dewatering screens on the jigs have been abandoned. By means of a system of settling tanks and dewatering elevators, the washed coal is delivered to the driers, without separating the fine from the coarse and with about 25 per cent. of moisture. The water from the driers carries about 40 per cent. of solids and is returned to the settling tanks. It requires 6 hp. per unit for the dewatering elevators and a constant power consumption of 27 hp. for each drier, and there are no "peak loads," as we had while using the cones. By means of the settling-tank system, a small tonnage of fine sludge is collected as secondary coal, and a pump requiring 35 hp. returns all the water to the jigs and does not have to handle water containing a high percentage of solids. It is expected eventually to reclaim the above mentioned sludge as primary coal. There will then be no water constantly flowing away from the plant and creating a continuous coal loss

One of these units has operated 39 days under the new system, another 12 days and the third 5 days. The average moisture content of the coal from all three driers, for the entire period, is 6.5 per cent. We have had nine days' operation of one machine in which the average moisture content was 4.5 per cent.

The result of this one year's experience, I believe, shows that a combination of dewatering elevators and centrifugal driers is essential for the successful use of the drier where the percentage of fine sludge coal is as high as what exists here. I am not as yet prepared to give conclusive data on the cost of this method but our experience to date strongly indicates a considerable saving over the original installation.

G. R. DELAMATER,
Consulting Engineer.

Harrisburg, Penn.

## Mining Laws, Legislation and Mine Regulations

*Letter No. 38*—While the Pennsylvania bituminous mining laws (1911) seem to be generally good and sufficiently strong to insure the required protection of life and property, there are some portions deserving of criticism. For example, the last clause of Sec. 3, Art. 10, prohibiting the use of open lights on return airways reads:

**The provisions of this section shall not apply to any mine wherein explosive gas is generated only at the face of active entries.**

Again, Sec. 2, Art. 28, reads:

**The provisions of this act as to mines or portions of a mine generating explosive gas in quantities sufficient to be detected by an approved safety lamp shall not apply to any mine wherein explosive gas is being generated only in live entries.**

The last section quoted has reference to the entire bituminous law relating to the generation of gas in mines. From the reading of the two passages quoted, it would appear that the law applies only to entries that *are being driven* in mines—"live entries"—and does not apply to rooms and pillar work where explosive gas frequently accumulates in greater and more dangerous quantities than in live entries. In other words, these passages seem to annul or completely destroy the protection that would otherwise be afforded by the law in this respect.

Another seeming incongruity occurs in Sec. 1 and 2, Art. 10, and Sec. 1 and 2 of Art. 20, both of which provide for an appeal from the judgment of the mine inspector; and, not only this, but a further appeal from the joint decision of other inspectors called to investigate the case may be made to the courts if the parties interested are still dissatisfied.

The law thus makes it possible for a mine operator, superintendent or foreman to give the district inspector much trouble and cause him worry and annoyance, all of which has the effect to undermine the authority of an inspector. In my opinion, the repeal of these sections of the bituminous law to which I have referred would do much to improve the work of mine inspection in the state and assist to enforce the instructions and recommendations of the inspector in every district.

I want to mention briefly a few of the features that I believe should be incorporated in every mining law. They are as follows:

No person should be permitted to work inside of any mine who cannot speak and understand the English language.

No person shall be competent to act as mine superintendent until he has successfully passed an examination and obtained a first-grade mine-foreman's certificate.

In order to double the frequency of inspection visits in all mines, the law should provide for an assistant mine inspector in every district.

The law should regulate and control the company-store curse of some mining districts.

A workmen's compensation act providing needed assistance for disabled workmen and the support of their dependents, in case of fatal accidents, should be in force in every state.

The law should provide for an interchange of state certificates or for a universal certificate that would qualify the holder for filling the same position in any coal-mining state in the Union.

The law should prohibit the sale of intoxicating liquors in all mining towns and districts.

If these and similar provisions were made a part of our mining laws, the result would be to produce safer, cleaner and healthier conditions in and about the mine. In closing, I want to say that I fully believe that the appointment of mine inspectors by the governor of the state is the best method that can be adopted in order to secure competent men for the position.

H. R. K.

Curtisville, Penn.

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*Letter No. 39*—In the discussion of needed mining laws and legislation, it seems to me it would be well to draw attention to the fact that, in many mining states, the assistant mine foreman is not required to pass an examination or to hold a certificate of competency, while he is often called upon to discharge the mine foreman's duties in the absence of the latter. This is the case in respect to the assistant mine foreman of nongaseous mines, in the bituminous districts of Pennsylvania. The bituminous-mine law of Pennsylvania (1911) does not appear to require the assistant mine foreman to pass an examination or to hold a certificate of competency.

Art. 4, Sec. 1, reads, in part, as follows:

* * * If the mine is generating explosive gas in quantities sufficient to be detected by an approved safety lamp, the mine foreman must possess a first-grade mine foreman's certificate. If the mine is nongaseous, the mine foreman must possess either a first-grade mine foreman's certificate or a second-grade mine foreman's certificate.

When the mine workings become so extensive that the mine foreman is unable personally to carry out the requirements of this act pertaining to his duties, he shall have the right to employ a sufficient number of competent persons to act as his assistants, who shall act under his instructions in carrying out the provisions of this act. If the mine is generating explosive gas in quantities sufficient to be detected by an approved safety lamp, the mine foreman's assistants must possess first-grade assistant mine foremen's certificates.

In case of the necessary temporary absence of the mine foreman, he may deputize his work, for the time being, to his assistant, who shall perform all the duties of the mine foreman.

Sec. 24, of the same article, reads as follows:

When assistant mine foremen are employed, their duty shall be to assist the mine foreman in complying with the provisions of this act; and, in the absence of the mine foreman, they shall perform the duties of the mine foreman and shall be liable to the same penalties as the mine foreman for any violation of this act.

Art. 24, Sec. 4, provides for mine foremen's certificates of two grades—the first requiring an average of 80 per cent. in examination and entitling its holder to perform the duties of mine foreman in *gaseous* mines; the second requiring the same average percentage in examination and entitling its holder to perform the duties of mine foreman in *nongaseous* mines. The law then concludes as follows, in reference to assistant foremen:

Certificates of qualification as assistant mine foremen shall be granted to persons who have given to the board of examiners satisfactory evidence of their ability to perform the duties of assistant mine foremen in gaseous mines and who shall have received an average of at least 70 per cent. in the examination.

All applicants for certificates as mine foremen and assistant mine foremen in gaseous mines must also undergo an oral examination in the presence of explosive gas.

It is clear, from the above quotations of the law, that the assistant mine foreman is not only required by law to perform the duties of the mine foreman, but is held responsible for such performance and made liable to the same penalties as the mine foreman, for any violation of the act. The question may well be asked, Can the law impose a penalty on an assistant mine foreman for any violation of the act when he is not required by that law to qualify for the position he holds? If the mine foreman in charge of a nongaseous mine has been required by law to qualify for that position, why should not all of his assistants be required to do the same if they are held liable, by law, for the discharge of his duties?

MINER.

Bolivar, Penn.

# Study Course in Coal Mining

By J. T. Beard

## The Coal Age Pocket Book

### HAULAGE FORMULAS

The following formulas apply to all locomotive haulage, but care must be taken to give values to the several coefficients that will correspond closely to the conditions relating to track resistance and adhesion of the driving wheels to the rails. Assume the following symbols:

$W_m$ = weight of locomotive resting on drivers (*tons*);
$W_t$ = weight of loaded trip hauled (*tons*);
$T.E.$ = tractive effort of locomotive (*lb.*);
$c$ = coefficient of adhesion of wheels to rails (0.15 to 0.35, *sanded rail*);
$T_t$ = track resistance (*lb. per ton of moving load*);
$R_g$ = grade resistance (*lb. per unit per cent. of grade*);
$g$ = percentage of grade of track (*not exceeding 10 per cent.*);
$S$ = speed of hauling (*mi. per hr.*);
$D.P.$ = drawbar pull (*lb.*).

**Tractive Effort vs. Resistance**—In locomotive haulage, there are two main factors; namely, the **tractive effort** of the locomotive acting to produce motion; and the resistances—**track resistance** and the **grade resistance** acting to oppose motion on upgrades. On downgrades, the grade resistance becomes an equal **grade factor** acting to produce motion.

The **tractive effort** of a locomotive is found by multiplying the weight on the driving wheels by the coefficient of adhesion (c) of the wheels to the rails or the **tractive coefficient.** The tractive effort per ton on the drivers is therefore 2000 c.

The **track resistance, grade resistance** and **grade factor,** as the case may be, are estimated, respectively, in pounds per ton of the entire moving load ($W_m + W_t$).

The following equations express the equality of the opposing factors in a moving train, on a level track and on ascending and descending grades, respectively:

Level track, $(2000\ c)\ W_m = R_t\ (W_m + W_t)$ (1)

Ascending grade, $(2000\ c)\ W_m = (R_t + 20\ g)(W_m + W_t)$ (2)

Descending grade, $(2000\ c)\ W_m = (R_t - 20\ g)(W_m + W_t)$ (3)

The **ratio of weight** on drivers to entire moving load, for each respective case is shown as follows:

Level track, $$\frac{W_m}{W_m + W_t} = \frac{R_t}{2000\ c} \quad (4)$$

Ascending grade, $$\frac{W_m}{W_m + W_t} = \frac{R_t + 20\ g}{2000\ c} \quad (5)$$

Descending grade, $$\frac{W_m}{W_m + W_t} = \frac{R_t - 20\ g}{2000\ c} \quad (6)$$

From the above ratios is easily obtained the following: ratios of load hauled to weight on drivers:

Level track, $$\frac{W_t}{W_m} = \frac{2000\ c}{R_t} - 1 \quad (7)$$

Ascending grade, $$\frac{W_t}{W_m} = \frac{2000\ c}{R_t + 20\ g} - 1 \quad (8)$$

Descending grade, $$\frac{W_t}{W_m} = \frac{2000\ c}{R_t - 20\ g} - 1 \quad (9)$$

## The Coal Age Pocket Book

**Conditions of Hauling on Downgrades**—It is important to observe that when descending a grade the grade resistance, as previously stated becomes a **grade factor** acting to produce motion. Hence, when the grade factor becomes equal to the track resistance, the necessary tractive effort of the locomotive becomes zero and the entire train gravitates down the plane at a uniform speed. This occurs when

$$20\ g = R_t; \quad \text{or } g = \frac{R_t}{20} \quad (10)$$

Expressed as a rule, the grade of this **self-acting incline** is one-twentieth of the track resistance. For a track resistance of 30 lb. per ton, the self-acting grade is $30 \div 20 = 1.5$ per cent. When a locomotive is operating on such a grade, no tractive effort is required on the part of the locomotive to maintain the speed of the descending train.

**Drawbar Pull**—The drawbar pull is the force required to move the trailing load or the load hauled ($W_t$). It is found, for a level road, by multiplying the track resistance in pounds per ton, by the weight of the trip hauled in tons; thus,

Drawbar pull (level oad), $D.P. = R_t W_t$ (11)

When **hauling on an upgrade** the grade resistance must be added to the track resistance and their sum multiplied by the weight of the trip hauled, as before; thus,

Drawbar pull (upgrade), $D.P. = (R_t + 20\ g)\ W_t$ (12)

When **hauling on a downgrade** less than what is self-acting the grade resistance must be subtracted from the track resistance and the difference multiplied by the weight of the trip hauled in tons; thus

Drawbar pull (downgrade), $D.P. = (R_t - 20\ g)\ W_t$ (13)

**Difference between Tractive Effort and Drawbar Pull**—The tractive effort of a locomotive is the force it is able to exert to move the entire load including its own weight and as previously stated, this force depends only on the weight ($W_m$) resting on the drivers and the tractive coefficient (c), as express by the formula

$$T.E. = 2000\ cW_m \quad (14)$$

**Tractive effort** is only a possible force which may or may not be wholly utilized in moving the train, depending on the load hauled and the track and grade resistances. The grade of a road may be so steep that the tractive effort is wholly consumed by the grade resistance of the locomotive, which can then only propel its own weight up the plane. Then,

$$20\ gW_m = 2000\ cW_m$$

and $$g = 100\ c \quad (15)$$

Or, assuming a tractive coefficient $c = 0.16$, the limiting grade is

$$g = 100 \times 0.16 = 16\ \textit{per cent.}$$

**Drawbar pull,** on the other hand, is a positive factor that is always determined by the net resistance of the trip hauled, which depends on the weight of the trailing load, and the track and grade resistances. The drawbar pull, under the varying conditions of haul is expressed by Formulas 11, 12, 13.

# Inquiries of General Interest

## Electric-Haulage Problem

*(Concluded from last issue)*

Having decided on the weight of the locomotive necessary to haul the desired number of loaded cars over the given grades, the next step is to determine the power of the motors that will be required to produce a given speed of haul, say from 6 to 8 mi. per hr. As a basis of this calculation, it is important to observe that the effective power, in foot-pounds per minute, is equal to the tractive effort in pounds, multiplied by the speed in feet per minute, as expressed by the formula

$$\underset{\text{(ft.-lb.p.m.)}}{\textit{Power}} = \underset{\text{(lb.)}}{\textit{tractive effort}} \times \underset{\text{(ft.p.m.)}}{\textit{speed.}}$$

Now, estimating the horsepower required per ton on drivers, per mile-hour, assuming a tractive coefficient $c = 0.16$, we have

$$\textit{Tractive effort (per ton)} = 0.16 \times 2000 = 320\ lb.$$

$$\textit{Speed (per mi.-hr.)} = 5280 \div 60 = 88\ ft.p.m.$$

$$\textit{Horsepower (per ton-mi.-hr.)} = \frac{320 \times 88}{33{,}000} = 0.85\ hp.$$

This is the effective horsepower per ton-mile-hour, or the power that must be available to produce a speed of 1 mi. per hr., for each ton of weight resting on the drivers. Assuming an efficiency of 85 per cent., the input to the motors should be 1 hp. per ton-mi.-hr.

Using a 25-ton locomotive for this haulage and assuming that the entire weight of the locomotive is on the drivers, the actual horsepower of the motors required for a speed of 6 mi. per hr. will be $25 \times 6 = 150$ hp., which corresponds to a wattage of $150 \times 746 = 111{,}900$ watts delivered to the motors.

It is interesting to note here that the effective wattage per mile-hour, in electric mine haulage, is practically twice the tractive effort of the locomotive, in pounds. This is shown by the following simple calculation, since a speed of 1 mi. per hr. is equal to 88 ft. per min. and 1 hp. is equivalent to 746 watts:

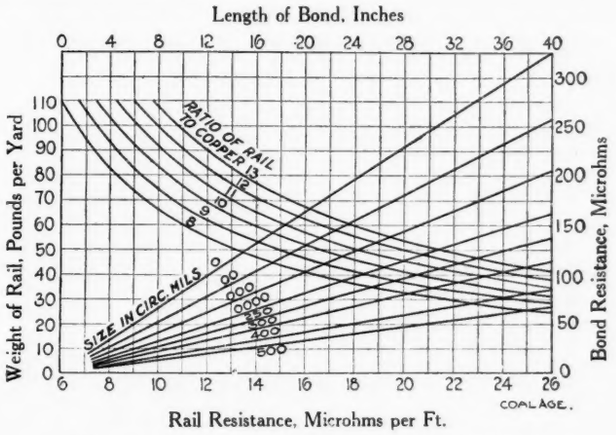
$$\textit{Effective watts (per mi.hr.)} = 746\left(\frac{88 \times T.E.}{33{,}000}\right) = \textit{say}\ 2\ T.E.$$

Under the assumed conditions, it was previously estimated that the total tractive effort when hauling up a 3-per-cent. grade is 110 lb. per ton of moving load, which makes the effective wattage required in that case $2 \times 110 = 220$ watts per ton-mi.-hr. In like manner, it was estimated that the total tractive effort when hauling up a 1½-per-cent. grade was 80 lb. per ton, which makes the effective wattage required to haul up that grade $2 \times 80 = 160$ watts per ton-mi.-hr.

In electric mine haulage, it is customary to estimate on hauling at a speed of, say from 6 to 8 mi. per hr. Taking the actual power of the motors at 1 hp. per ton-mi.-hr., to give an input of 111,900 watts on a 500-volt circuit will require a current of $111{,}900 \div 500 =$ say 224 amp.

The weight of rail in pounds per yard, in locomotive mine haulage, may be taken as twice the weight of the locomotive in tons, or, in this case, $2 \times 25 = 50$ lb. per yd. In estimating the size of wire required to transmit this current from the generator to the siding at the foot of the slope in the mine, we will assume a rail-return, using 50-lb. rails for the track, bonded with compressed-terminal bonds, 24 in. long. The length of track from the end of the siding at the foot of the slope to the tipple is about 5400 ft. The length of trolley wire extending to the power plant will be assumed as 5600 ft.

Referring now to the diagram shown in the accompanying figure, first find the resistance of 5200 ft. of the two 50-lb. rails in the track-return, including the resistance of the bonds, assuming a rail to copper ratio of 1:11 and rails 30 ft. long, making $5400 \div 30 =$ say 180 bonds in a single length of rail. Following the horizontal line marked 50 on the left of the diagram, to its intersection


Length of Bond, Inches
0 4 8 12 16 20 24 28 32 36 40
Weight of Rail, Pounds per Yard
110 100 90 80 70 60 50 40 30 20 10 0
Bond Resistance, Microhms
300 250 200 150 100 50 0
RATIO OF RAIL TO COPPER 13 12 11 10 9 8
SIZE IN CIRC. MILS 0 00 000 0000 250 300 400 500
6 8 10 12 14 16 18 20 22 24 26
Rail Resistance, Microhms per Ft.
COAL AGE.

RESISTANCE DIAGRAM FOR BONDED RAILS

with the curved line indicating a rail-to-copper ratio of 1:11; and, from that point, following the vertical line to the scale at the bottom of the diagram, we find a resistance of 18 microhms per foot of rail or $30 \times 18 = 540$ microhms per rail. In like manner, for a 24-in., 4-0 bond, follow the vertical line marked 24 on the top scale down to its intersection with the diagonal 4-0; and, from this point, follow the horizontal line to the right-hand scale, which shows a bond-resistance of 100 microhms.

The total resistance for 180 bonded rails is, therefore, $180\ (540 + 100) = 115{,}200$ microhms, or 0.1152 ohm. The resistance for a two-rail return is one-half this amount, or 0.0576 ohm. The voltage absorbed in the rail-return is $E = CR = 224 \times 0.0576 = 12.9$ volts. The line drop for 5600 ft. of T. B., 4-0, copper wire, carrying a current of 224 amp., as taken from wire tables, is 5.6 $(224 \times 0.0489) = 61.3$ volts. The difference of potential at the generator is therefore $61.3 + 12.9 + 500 = 574$ volts.

Finally, assuming an efficiency of 90 per cent., the power required to run the generator is:

Input to generator,

$$(574 \times 224) \div (0.90 \times 746) = \text{say } 190\ hp.$$

Boiler horsepower, efficiency of engine being 90 per cent.

$$190 \div 0.90 = \text{say } 210\ hp.$$

# Examination Questions

## Hoisting Engineers' Examination Held at Terre Haute, Ind., Sept. 10, 1914

(*Selected Questions*)

*Ques.*—(a) An engine cylinder is 12 in. in diameter and 18 in. long; what is its sectional area? (b) Find the cubical contents of this cylinder.

*Ans.*—(a) The sectional area of the cylinder is $0.7854 \times 12^2 = 113.1$ sq.in.

(b) The cubical contents of this cylinder is $113.1 \times 18 = 2035.8$ cu.in.

*Ques.*—What parts of a stationary engine should receive particular attention at the beginning of each shift?

*Ans.*—Before running the engine, all oil cups should be examined and filled; the engine guides and other bearings properly cleaned; the brake, cable-fastenings and all bolts and nuts carefully examined to see that they are secure. In addition to this, the engine should be operated for one or two hoists, after taking the precaution to first open the dripcocks to allow the expulsion of any water of condensation that may be in the cylinder.

*Ques.*—How may the water consumption of an engine be calculated?

*Ans.*—The water consumption, or water rate, depends on the style or type of engine in use, and may be calculated by a formula involving the mean-effective, steam-cylinder pressure, the dimensions of the steam cylinder and the percentage of clearance. Without these data at hand, a water rate of, say 40 lb. per hp. per hr., may be taken as a fair average weight of steam required for an ordinary slide-valve engine of the type commonly employed for hoisting in many mining districts. On this basis, the indicated horsepower of the engine multiplied by 40 will give the water consumption of the engine per hour.

*Ques.*—(a) Why are spring safety catches to be preferred to those operated by a weight and lever, on cages in a hoisting shaft? (b) How would you make a test of safety catches?

*Ans.*—(a) A safety catch dependent on the action of a weight attached to a lever would be practically inoperative in case of accident. When the cage started to fall the weight would fall with it, the two having practically the same velocity, except for the friction of the guides in the shaft, which would slightly retard the descent of the cage and cause the weight to act feebly with insufficient force to operate the catches, until the cage comes to rest at the bottom of the shaft. On the other hand, the action of the spring is not impeded by the fall of the cage, the force of the spring remaining unchanged at the time of the fall.

(b) The best method of proving safety catches is to put them to the actual practical test. For this purpose, the empty cage may be first raised a few feet above the landing and a fastening arranged that can be easily detached, allowing the cage to fall. If the catches prove sufficient, and the fall of the cage is arrested before it reaches the landing, the same test may be repeated with a loaded car of coal on the cage.

*Ques.*—How is the horsepower of an engine determined? Show the method by figures.

*Ans.*—In practice, the horsepower of a steam engine is calculated from an indicator card taken while the engine is in operation. This card shows the varying steam-cylinder pressure throughout each successive stroke of the engine. From the card, the mean-effective pressure in the cylinder is determined. To find the horsepower of the engine, multiply this mean-effective pressure by the area of the cylinder, in square inches, and that product by the piston speed, in feet per minute. Dividing this result by 33,000 will give the indicated horsepower of the engine.

For example, assume a single engine 10x12-in. cylinder, mean effective pressure 50 lb. per sq.in., running at a speed of 300 r.p.m., and find the horsepower developed. The diameter of this cylinder is 10 in. and its area $0.7854 \times 10^2 = 78.54$ sq.in. The length of stroke is 12 in. or 1 ft., and the engine makes $2 \times 300 = 600$ strokes per min. The horsepower of the engine is, then,

$$H = \frac{plan}{33{,}000} = \frac{50 \times 1 \times 78.54 \times 600}{33{,}000} = 71.4\ hp.$$

*Ques.*—What care should be taken of steam boilers to secure the best results from their use?

*Ans.*—Steam boilers should not be forced; that is to say required to generate more steam than what can normally be expected from the particular type of boiler and the area of its heating surface. For example, a return-tubular boiler will give, normally, an evaporation per hour, of from 2 to 2½ lb. of water from and at 212 deg. F., for each square foot of its heating surface; and a flue boiler about one-half again as much or, say from 2 to 3 lb. of water from and at 212 deg., per square-foot-hour. When, by a forced draft or overfiring, a boiler is made to generate a much greater quantity of steam there is danger of the fire-plates being burned and injured, especially if these plates are covered with scale.

Steam boilers should not be run continuously for too long a period; they should be blown off at regular intervals of time, say not to exceed one month; but when using a poor feed water that forms scale in the boiler, these periods should not exceed a week or ten days. Boilers should be thoroughly examined and cleaned regularly. If any repairs are needed or a leaky joint is discovered these should be given prompt attention.

Steam boilers should not be subjected to sudden changes of pressure or temperature; they should be evenly and regularly fired by an experienced fireman. Such sudden changes of pressure and temperature cause alternate contraction and expansion of the boiler sheets, which opens the joints and otherwise injures the boiler. The boiler foundation and settings should not be allowed to settle without immediate attention, as this settlement will throw undue strains on certain parts and weaken the boiler. The water level in the boiler should be kept as nearly uniform as possible.

# Coal and Coke News

## Washington, D. C.

The House of Representatives Committee on Mines which was directed to investigate the Colorado coal strike situation some months ago, rendered its report shortly before the adjournment of Congress and the document has just been published. It reviews the general conditions at the mines and makes some extremely vague and general recommendations for future Federal interference in controversies of a like sort but apparently has little or nothing to suggest with reference to the better adjustment or settlement of the present problem.

The report opens with an account of the work done by the investigators and then passes to a review of the general coal mining situation in the state which is sketched as follows:

There are employed in normal times about 15,000 coal miners in the state. We beg to call attention to the evidence of Russell D. George, state geologist, as to the coal fields of the state, page 7, hearings. It should be remembered that in Colorado there are large coal deposits of anthracite, bituminous, and sub-bituminous coal. The seams range in thickness from 3½ to 1. feet. There are thousands of square miles of coal lands and estimated billions of tons. There is very little shaft mining in the state. The coal as a rule is easily mined. It must be remembered that a great deal of the coal lands is so situated that it is not practicable to mine the coal. In the cañons the mines on the edge have all the advantage, and where a company or individual owns the front as it is frequently impracticable to get to the coal which lies back of this so as to profitably mine it. There are many coal companies and persons operating in the state, but the three largest are the Colorado Fuel & Iron Co., which also operates steel mills at Pueblo; the Victor American Fuel Co., and the Rocky Mountain Fuel Co. The first of these companies owns and leases about 300,000 acres of coal and other lands.

The Victor American Fuel Co. owns and controls in the Colorado fields about 50,000 acres, besides having under lease coal lands in New Mexico; the Rocky Mountain Fuel Co. owns and controls approximately about 31,000 acres, so that in dealing with the strike these three large companies seemed to dominate the coal-producing companies of the state and were the real power. There are a number of independent companies, but they acted with the larger ones and seemed to be under their control and protection at all times. A circular was issued during the strike signed by the officials of these three companies claiming they represented 95 per cent. of the coal production of the state, and they must have had authority to issue such a circular. Colorado has been unfortunate in having a strike in its coal mines each 10 years. They are usually fierce struggles and always attended with violence, and this one was no exception to the rule.

The document here narrates the history of the various conflicts in the mines, the arming of both sides in the struggle, arms and ammunition having been purchased and imported, and finally, the intervention of the militia and troops. Both sides are severely blamed for refusal to arbitrate and a general indisposition to regard the rights of others, although the companies are subjected to the sharpest criticism on account of the methods employed for the control of the mining communities, the maintenance of business at company stores, and other acts of the same kind.

### The Majority Report

In summing up the situation the majority report says:

In Colorado it appeared that men on either side seemed to lose the respect they should have had for the rights of others, and at one time in the course of the strike there seemed to be a condition of anarchy throughout the southern part of the state. It has been unfortunate for Colorado and its people that these strikes should occur at stated periods with apparently no way to settle them except by force. We can not too strongly urge arbitration as a means of settling these disputes between capital and labor, and the people of this country are rapidly reaching the conclusion that parties to such a dispute must not be permitted to embroil a state or states in a prolonged and bloody warfare that disturbs so disastrously the peace and welfare of the Nation. To this end the Congress has created a Commission on Industrial Relations and authorized it to thoroughly investigate and ascertain the underlying causes leading up to struggles such as the Colorado strike and similar disturbances, and if possible suggest an effective remedy.

All concerned in the unfortunate situation that existed in Colorado for so many months are to be congratulated that at least a partial settlement has been reached. Many efforts have been made by various agencies other than those set in motion by the President and by the Congress to find a solution. In the end a proposal was made by President Wilson that all future difficulties be referred to a board of conciliation or arbitration, which should consist of three members of nation-wide reputation for ability and fairness. The miners accepted this proposal and called off the strike, but the operators have refused to accept this arrangement. It is yet to be seen whether the force of public sentiment will impress itself upon them in due time sufficiently to cause a thoroughly mutual acceptance of this principle of arbitration, which, while not wholly satisfactory to either party, is unquestionably for their best interests and the best interests of the public.

By a gradual but sure development the coal business of the country is being conducted on a large scale and by frequent consolidations is largely being carried on by large companies. Next to the business of transportation the fuel business of the country touches the people and their business in an intimate and important way. If these strike troubles continue to break forth, it will plainly be necessary to consider seriously whether some measure of regulation shall not be adopted with reference to this business as carried on in interstate commerce, as is now done with reference to the business of transportation.

In a minority report, Representative Austin makes the following recommendations:

That if the parties to a coal strike fail or are unable to come to an agreement, the matters in controversy be referred to the Chief Justice of the United States Supreme Court as an arbitrator, and in the event of his sickness or unwillingness to serve, he request one of the associate justices of the Supreme Court to act as arbitrator.

As the importation into Colorado of alien or foreign labor has been largely responsible for the last two strikes, resulting in the loss of over 60 lives and property, business, and wages amounting to $18,000,000 in the recent strike, the passage of a law to restrict undesirable or foreign immigration is of the greatest importance in preventing a repetition of the recent deplorable trouble in that state, practically amounting to a civil war, and requiring, according to President Wilson's view, the presence of Federal troops for months. In the first strike 80 per cent. of the strike breakers were aliens. During the recent trouble 80 per cent. of the strikers were foreigners and 80 per cent. of the strike breakers were foreigners.

We should keep out of the United States strike breakers who do not speak our language; do not enter our country to make it their permanent home, and put forth no effort to learn our language or to become naturalized American citizens. Such a wise and patriotic measure as would accomplish this purpose was recently passed by more than a two-thirds vote by both Houses of Congress, and although Samuel Gompers, president of the American Federation of Labor, and the officers of the United Mine Workers, and thousands of others, including myself, appealed in vain to President Wilson in the name of and in the interest of organized and unorganized labor to make this bill the law of the land by signing it, he refused to do so. As a result the United States will continue to receive every year perhaps more than a million idle foreigners, ready and anxious to take the place and crowd out of employment the honest and deserving native and naturalized American citizens, and not only in Colorado but in every state in the Union. Until such a law is passed we will continue to have alien or foreign strike breakers in Colorado and other states.

### HARRISBURG, PENN.

Representative Myers has introduced a bill in the House for the creation and appointment of two assistant chiefs to the Department of Mines. One to be known as the "Assistant Chief of the Department of Mines for the Bituminous Region" and the other for the anthracite. The bill provides that the assistant chiefs shall be appointed by the Governor for a term of four years. It further provides that they shall have resided within the state for not less than 10 years immediately preceding their appointments. They shall be not less than 50 years of age and shall have had at least 15 years' practical experience in and around their respective classes of coal mines. They shall both have passed examinations given for inspectors in both regions respectively and shall hold certificates of competency qualifying them to act as such inspectors and they shall have had at least 8 years' active experience as mine inspectors under the Department of Mines immediately preceding their appointment as assistant chiefs, and shall be eligible for appointment without again being required to pass a written examination, but will have to stand an oral examination. The bill places the salary at $4500 per year. The chief of the department at $6000, inspectors at $4000 and deputies at $4000. The assistant chiefs are to be located at Scranton and Pittsburgh.

Representative Holleran has introduced two bills pertaining to the bituminous region, one of which calls for an inspection of the mines by a committee of miners, the other for uniformity in the size and weight of cars where coal is mined and paid for by weight.

The first bill provides that at every bituminous coal mine the miners employed therein shall have the right and authority at their option to select and appoint two or more of their number working at the mine as a miner's committee of inspection. The committee is to have the authority to inspect all sections of the mine with respect to its safety,

ventilation and drainage, at least once every three months, and report their findings to the chief of the Department of Mines and to the mine inspector of the district. It also gives them the right to investigate all fatal accidents.

The second bill provides that at every bituminous coal mine where coal is mined by measurement all cars filled by miners, etc., shall be uniform in each mine, except where by reason of difference in the thickness of the vein or veins being mined to a common tipple, such uniformity of cars is not practicable in the judgment of the mine inspector of the district. The said mine inspector is made final arbitrator in case of dispute, where cars are not required to be uniform in size and weight, and each individual car shall be branded with the proper weight of the empty car.

A bill providing for the refund of the money collected by coal dealers by reason of the anthracite tax has been introduced in the House by Mr. Garner. The bill provides that all coal companies who have collected from the people of the state any moneys by way of an increase in the price of coal, etc., when such state tax upon coal is thereafter declared unconstitutional by the Supreme Court of the state shall refund to all persons the additional moneys with interest in the manner set forth in the bill.

The Governor's Child Labor Bill appeared in the House during the week, and provides that no child under 16 years of age shall be employed inside of any bituminous or anthracite mine. It also states that every child shall, between the ages of 14 and 15 if employed, spend one full day a week in a vocational school, and the child between 15 and 16 years of age shall spend one-half day per week in a vocational school. The Governor in his inaugural address said that no child under 16 should work in Pennsylvania. He should be in school.

Representative Powell has introduced a bill in the House providing for four new inspectors in the anthracite region, three in the first inspection district, which is Luzerne County, and one in the second district or Lackawanna County.

In the event of a code for safety and regulation of operations being adopted by the committee of quarry owners, operatives and employees, the Department of Labor and Industry and the State Industrial Board it is probable that no steps will be taken by the Department of Mines to draft rules. A resolution was adopted by the last Legislature for such rules, but the state board found that it had powers to adopt rules and meetings have been held here during the week, which will be continued later in the month. If the code is adopted by the board it will go into effect in the summer.

## PENNSYLVANIA

### Anthracite

**Almedia**—There is at present considerable activity among the coal dredgers here who are anxious to get their dredges in operation on the Susquehanna River. Unless the weather prevents, work will probably start in a few days. Four dredges will be put to work.

**Hazleton**—John C. White, national president of the United Mine Workers of America, on Mar. 6, issued a call for a meeting of the executive boards of the three anthracite districts to be held at Wilkes-Barre, on Apr. 5. A date will then be fixed for the convention at which the next demands to be made upon the operators will be formulated. The present agreement expires in about one year.

**Summit Hill**—The Citizens' Committee of Summit Hill forming itself into the Summit Hill Civic Association, is negotiating for the purchase of 5½ acres of land at the place where Philip Ginter, the hunter, discovered anthracite coal in 1791, and where the first anthracite mine in the world was opened, and the coal shipped to Philadelphia to market. This land will be converted into an athletic field, and will be known as the Ginter Memorial Athletic Field.

**North Scranton**—Employees at the Fairview colliery of the Peoples Coal Co. were recently notified by the officials that the plant would close down indefinitely. The miners were instructed to remove their working tools and other belongings from the mine.

**Nanticoke**—A stubborn fire in the Lee and Ross fan house of the Susquehanna Coal Co. recently, for a time threatened the safety of the 1000 men at work in the mines, but the timely arrival of an emergency fire fighting locomotive of the Pennsylvania R.R. quickly conquered the flames. A call was sent to the Honeypot yard of the Pennsylvania R.R. and an engine was quickly equipped with the emergency outfit. The engine has 150 lb. water pressure and quickly got the best of the blaze. A fan house on the same site was destroyed by fire several years ago.

**Dunmore**—The Pennsylvania Coal Co. and the Hillside Coal & Iron Co. issued orders on Mar. 4, that from henceforth district superintendents, mine foremen, assistant mine foremen, outside foremen, weighmasters and clerks must not use intoxicants. Otherwise they will have to seek employment elsewhere. Binding instructions also accompany the order and the rule will be strictly enforced.

**Mauch Chunk**—The Lehigh Coal & Navigation Co. is making arrangements to open boating on the Lehigh and Delaware divisions of its canal on Mar. 15. Many improvements are now being made.

**Scranton**—In the production of 8,388,126 tons of coal in the five inspection districts of Lackawanna County and parts of other counties during 1914, 128 lives were lost; 142 mines were in operation in the five districts and more than 41,000 men and boys were employed in the industry. The coal produced in the county during the year shows no material decrease from the production of other years.

### Bituminous

**Uniontown**—Following the marked increase in coke production since the beginning of the present year, the H. C. Frick Coke Co. recently announced an increase in wages of 10 per cent. for practically all of its 17,000 employees.

**Greensburg**—John F. Bell, mine inspector for the 22nd bituminous district, in his recent report, showed that 5,169,332 tons of coal were mined during 1914. There were 25 mines in the district, most of them lying in Westmoreland County. Sixteen persons were killed while at work in the district. But little coke was made; the total output for the year being 29,743 tons.

**Scottdale**—The annual report of Mine Inspector B. R. Blower, for the 11th bituminous district, shows that the tonnage fell off in the past year to the extent of 1,068,096 tons, the production being 5,694,568 tons. There were 12 fatal accidents in and about the mines, 408,561 tons of coal being produced per fatality.

**Carroltown**—A large force of men has been made idle by the closing of the Buckwheat mine, acquired some time ago by the Peale interests. It is said there was some sort of a misunderstanding regarding royalty payments, but no statement of the trouble has yet been given out.

**Marianna**—The commission in charge of relief work at this place has been compelled to make another appeal to the people for funds to tide the needy over to Apr. 1, when it is expected the mines at Marianna will be put in operation. About five weeks ago part of the funds of the miners' union which was tied up in the failure of the Marianna bank were secured and this amount tided the needy over until this time.

## WEST VIRGINIA

**Wingrove**—The store belonging to the New River Coal Co. was destroyed by fire recently. The building was valued at $3000 while the stock of goods was valued at $7000. It is not known how the fire originated.

**Huntington**—Geologists and mining engineers are preparing to urge the legislature to make an adequate appropriation for the continuation of the West Virginia Geological Survey. It is stated that the appropriation for this Bureau has been cut from $45,000 to $7500, and that unless provision is made for a continuation of the Survey's work, it must soon be discontinued.

**Charleston**—More than 15,000 miners in the New River coalfield threaten to strike unless a satisfactory wage agreement is reached before the present agreement expires. The conference committee representing miners and operators adjourned their session Mar. 6 without reaching such an agreement.

**Fairmont**—At a recent meeting of the operating officials and sales managers of the Consolidation Coal Co., it was announced that the mines in the Fairmont district would be operating on full time in the near future.

## ALABAMA

**Birmingham**—Chief Mine Inspector C. H. Nesbitt states that the coal production for Alabama for 1914 will not exceed 15,000,000 tons, at least 2,000,000 tons less than during 1913. Mr. Nesbitt expects to have the 1914 annual report completed within the next week. There was only one fatal accident reported to the chief mine inspector in the coal mines in this district for the month of February. This is a record for this district.

## KENTUCKY

**Hazard**—Mining operations by the different coal companies in the vicinity of Hazard have improved 50 per cent. within the past 10 days. Orders are said to be piling up at all the plants—sufficient, it is said, to guarantee the operation of the mines

daily for the next 6 months. A number of the mines will also have to increase their output in order to fill the orders. The eastern Kentucky coal field is rapidly picking up to normal conditions.

The Kentucky Jewel Coal Co. recently secured a large order for coal to be shipped to the lake trade. This is the pioneer venture in getting the Hazard coal to the large markets around the Great Lakes and in the Northwest.

**St. Charles**—Owing to depression in the coal business the St. Bernard Mining Co. recently laid off 40 men at this place. The force was also considerably reduced at Shamrock and at all the mines at Earlington. The men were laid off indefinitely.

**Prestonburg**—Beginning with the first of March the Middle Creek Coal Co., which has been employing 200 miners, began on a new scale of all mine work and loading, which was a reduction of from 10 to 20 per cent.

The Beaver Pond Coal Co.'s mine here has been closed by the sheriff, as the result of claims which have been filed by the miners, who allege they have had only one payday in the last two months. The company is capitalized at $100,000. It has a contract with the city to supply electricity for the city lights and it is understood the power plant will be kept in operation.

### OHIO

**Hamden**—The mines of the Starr-Hocking Coal Co. have been closed indefinitely because of lack of demand.

**Columbus**—The Ohio Senate on Mar. 4 passed the Gallagher bill with only 9 dissenting votes. This measure allows coal miners and operators to agree independently of the Mine-Run Law enacted two years ago. The bill will go to the house where it is said to be assured of favorable consideration. This measure was designed to afford a settlement of the coal strike in eastern Ohio.

### INDIANA

**Oakland City**—Three men who were entombed in the Ayrshire coal mine near here Mar. 7 were found dead on Mar. 8 when the débris was cleared away. These men were placing props when they were crushed by a fall of slate.

**Brazil**—The leases of the Domestic Block Coal Co. on about 1300 acres of land which were allowed to lapse during the period of financial difficulty of the mining company are being renewed, and it is rumored that the mine will change hands shortly.

The American Coal Mining Co., made up of Brazil capitalists and representing $1,000,000 investment, has opened near Bicknell what is said to be the largest mine in Indiana, with a capacity of 4000 tons a day, from veins 5 and 6. The officers are: President, William M. Zeller; Vice-President, H. R. McClellan; Secretary-Treasurer, W. J. Snyder; Mine Manager, H. G. Conrad. Office headquarters have been established in Indianapolis.

**Sullivan**—Workmen have about cleaned up the Union mine of the Consolidated Coal Co., which recently shut down because of depressed trade conditions and higher freight rates than from competing mines. The rails will be pulled and the machinery transferred elsewhere.

### ILLINOIS

**Carlinville**—The mine of the Carlinville Coal Co. will be shut down for several months, probably until early fall. It will be closed in order to make urgent and necesssary repairs, namely, the installation of two boilers. These boilers were condemned by the inspector several months ago, and their use was discontinued. However, the company placed a traction engine at the air shaft of the mine to operate the fan. The 24 mules now in the mine will be removed until the repairs are completed.

**East St. Louis**—Announcement has been made by officials of the United Mine Workers that the gang that has been operating throughout the 5th and 9th Districts, selling fraudulent mining certificates to miners has been broken up. Early in January some of the ring leaders of this gang were captured and warrants were sworn out for others, who were indicted by the Grand Jury for selling to miners at prices ranging from $25 to $40 each a certificate permitting the miner to work in any mine in the State of Illinois as required by the state law. These counterfeit certificates were so perfect, both in the workmanship and in the forging of the signatures that the state officers, as well as the mine officers had a hard time in satisfying themselves that something was wrong.

**Pana**—Eight hundred miners at the Witt mine, west of here, were recently notified to remove all their tools from the mine, as it was going to shut down for an indefinite length of time. Four hundred miners employed at the Taylor Springs mine, near Hillsboro, were also notified that that operation would shut down for an indefinite period. These mines are controlled by the Peabody Coal Co., of Chicago.

**Panama**—The tipple and top works of the Shoal Creek Coal Co. at this place were destroyed by fire a short time ago. This will shut the mine down for many months.

### MISSOURI

**Rich Hill**—The shaft on the property controlled by the Atlas Coal Mining Co., near Rich Hill, where a disastrous explosion occurred last month, killing five miners, has been abandoned by order of the state coal mine inspector. The company is removing the machinery and equipment for use elsewhere. According to the owners of the land, another shaft will be put down near the old mine.

### COLORADO

**Denver**—The Victor-American Fuel Co., J. C. Osgood, president, has purchased a large area of valuable coal land in Routt County, Colo., between Steamboat Springs and Hayden on the line of the Denver & Salt Lake R.R., also the mine of the Pinnacle Coal Co., in the Pinnacle vein of coal, near Oak Creek on the same railroad and likewise in Routt County. This mine has an output of about 1000 tons per day and is one of the best mines in that section. The coal is 12 ft. thick and a high-grade domestic and steam fuel.

## PERSONALS

Andrew Fitzsimmons, a veteran employee of the Pennsylvania Coal Co., has been placed on the pension list. He served the company about 65 years.

Edward H. Coxe, of Knoxville, Tenn., is spending a couple of weeks in Wyoming, making an examination for the Union Pacific Coal Co. of its properties with reference to safety and welfare.

B. F. Riggs, chief of the construction department of the Consolidation Coal Co., has resigned his position, and in the future will devote all of his time to the management of the Fairmont Building & Investment Co.

Harry S. Bott, of Altoona, in company with J. P. Laughery and W. A. Elder, has leased an extensive tract of coal land bordering on Coal Pit Run near Ligonier, Penn., for the purpose of developing the upper Freeport vein of coal.

L. M. Dorsey, superintendent of the Piney Mining Co. at Riley, W. Va., for the past 11 years, has given up that position and moved to Winding Gulf, to become assistant superintendent of the operation of the Winding Gulf Colliery Co.

F. K. Day has been appointed division engineer in charge of the engineering works in West Virginia of the Consolidation Coal Co., in place of E. B. Moore, chief engineer resigned. Loman Riggs of the same company has been promoted to assistant division engineer.

Edward Cunningham, of Thurber, Texas, president of the United Mine Workers of Arkansas, Oklahoma and Texas, has resigned. William McLachlin, of Huntington, Ark., has been temporarily appointed to succeed Mr. Cunningham, who it is understood is to become state mine inspector in Texas.

Joseph Meister, president and general manager of the Meister Coal Co., together with Jacob Meister, secretary of the same firm, both of Flushing, Ohio, recently made a trip to West Virginia to look over some coal lands in the Kanawha County field. They are contemplating taking over a block of coal in that district and opening operations.

T. A. Bennett, who for the past 5 years has had charge of the conveyor and elevator belt sales of the B. F. Goodrich Co., Akron, Ohio, has severed his connection with the Goodrich company, to become the assistant to the general sales manager of the New Jersey Zinc Co., with offices in New York City. Mr. Bennett will be succeeded by J. D. Mooney, formerly special mining representative for the Goodrich company.

## OBITUARY

Harvey S. Robins, a wealthy coal dealer, of Shamokin, Penn., died recently at Charleston, W. Va., where he had been spending the winter. The body was brought back to Shamokin and interred in the family plot at Reed Station Cemetery.

Edward F. Boyle, 41 years of age, died at the Uniontown Hospital Mar. 5 from the effects of injuries sustained through the bursting of a sheave wheel at the plant of the H. C. Frick

Coke Co., where he was mine foreman. Mr. Boyle has been employed at the mine for many years. He began at the Valley Works, but was later transferred to Leisenring No. 1 as fireboss. Mr. Boyle was born in Ireland and came to America about 20 years ago. He married Miss Sarah Walsh, sister of Mine Inspector Walsh at Scottdale. His widow and four children survive. Interment took place at Scottdale.

## PUBLICATIONS RECEIVED

**Department of the Interior,** Bureau of Mines—"Hand Firing Soft Coal Under Power Plant Boilers," by Henry Kreisinger. Eighty-three pages, 6x9 in., illustrating and describing the best methods of hand firing boilers with soft coal.

**Department of the Interior,** Bureau of Mines—Miners' Circular 21, "What a Miner Can Do to Prevent Explosions of Gas and Coal Dust," by George S. Rice. Twenty-four pages, 6x9 in., unillustrated.

**Department of the Interior,** Bureau of Mines—"Procedure for Establishing a List of Permissible Miners' Safety Lamps, Character of tests, conditions under which lamps will be tested and fees." Ten pages, 6x9 in., unillustrated.

## CONSTRUCTION NEWS

**Hazard, Ky.**—The Lexington & Eastern R.R. has announced its intention of building a 3-mile branch line of road up Buffalo Creek just above Hazard to reach a rich undeveloped coal field. Coal development work is to be started at once on Buffalo Creek.

**Whitesburg, Ky.**—It is said that an Eastern syndicate is purchasing coal lands in Knott County for the purpose of beginning early developments. A large part of the new purchase lies along Carr's Fork of Kentucky River. A new extension of the Lexington & Eastern will be necessary.

**Cadiz, Ohio**—The construction of a branch railroad from the Wheeling & Lake Erie at Adena, which will extend to this place, opening up a considerable territory heretofore inaccessible is assured by the filing of a mortgage in Cleveland for $600,000 by the Short Creek Coal Co. The new line is to be known as the Adena, Cadiz & New Athens Railroad.

**Exeter, Penn.**—The Pennsylvania Coal Co. will shortly begin the erection of a new pump house in the Muddy Brook Colliery. This structure will be in the 11-ft. coal bed and be built of solid concrete with steel reinforcing. The roof will be arched. An idea of the size of the proposed structure may be gained from the statement that it will cost upward of $10,000.

**Kemmerer, Wyo.**—The Lincoln-Kemmerer Coal Co., a recently formed corporation with a capital stock of $250,000, is opening a new mine near here and within a short distance of the main track of the Oregon Short Line. A slope is being sunk on a 12-ft. bed of coal of unusual quality, and the product of the new mine will be on the market within a few weeks.

**Barbourville, Ky.**—Pennsylvania owners of 30,000 acres of coal and timber land in Clay County, Ky., recently met with a delegation of Clay and Knox County land owners and went over plans for a proposed railroad extension from Barbourville to Manchester, a distance of 24 miles. Clay is one of the few remaining Kentucky counties without a railroad. It is understood that the Pennsylvania interests want a free right of way and a moderate bonus, which it is believed will be forthcoming.

**Du Quoin, Ill.**—On or about the first of April engineers will begin the surveying for a continuation of an electric line operating through the coal fields of Perry, Franklin, Williamson and Saline counties, with the objective point opposite Paducah on the Illinois shore. This line will open up an entirely new territory practically all the way through. From here it will go through Royalton, on to Herrin and Marion, then east through Williamson County to Carrier Mills in Saline County, and south through Hardin County to the Ohio River. It is understood that foreign capital is behind the road, and that it will be a continuation of what is now known as the Southern Traction Co. operating a short distance out of St. Louis, but which has a franchise to operate to this city.

**Boston, Mass.**—The trustees of the Boston City Hospital will receive proposals for a coal pocket and coal handling apparatus to be constructed at the Boston City Hospital until 12 o'clock noon Mar. 16, 1915, at which time these proposals will be publicly opened and read. All proposals must be made on blank forms obtainable at the office of the engineers of the work, Bensmore & LeClear, 88 Broad St., Boston. All bidders will be required to give the trustees satisfactory assurance of their competency, experience and responsibility. Proposals must be accompanied by a certified check on a Boston bank for $500, payable to the City of Boston. The right is reserved to reject any and all bids and to waive any defect or informality at the discretion of the trustees. John J. Dowling, M. D., is superintendent.

## NEW INCORPORATIONS

**Cleveland, Ohio**—The Cambridge Colliery Co. has increased its capital stock from $1,600,000 to $2,000,000.

**Nashville, Tenn.**—The King-Harlan Coal Co. has been organized with a capital of $150,000. The incorporators are Tyler Calhoun, A. H. Wood, A. L. Childress, Harry Ward, and Harold C. Trabue.

**Chicago, Ill.**—The John A. Logan Co., of Chicago, was recently organized with a capital stock of $50,000 to mine, buy and deal in coal and other minerals. The incorporators are Andrew J. Ryan, James E. Condon and Thomas J. Condon.

**Mullins, W. Va.**—The Mead-Toliver Coal Co. and the Wood-Sullivan Coal Co. both of Mullins, were recently organized with a capitalization of $100,000 each. Both firms were organized with the same list of incorporators, namely, J. B. Sullivan, of Mullins, J. E. Toliver and Joe L. Smith, of Beckley, and H. P. Mead, of Maben.

**Mullins, W. Va.**—The Devils Fork Coal Co. was recently organized with chief works at Barkers Ridge in Wyoming County. The capital stock is placed at $100,000 and the incorporators are James Collins, of Bramwell, L. M. Franz, of Mullins, William Rezzonico, of Good Will, E. E. Hargsock, also of Good Will, and S. P. Franz, of Mullins.

## INDUSTRIAL NEWS

**Liverpool, England**—The coal-heavers strike which tied up shipping at this port for some time has been settled. Some of the men returned to work Mar. 4 while the balance resumed work Mar. 5.

**Huntington, W. Va.**—Huntington will probably be the scene of the proposed gathering of West Virginia coal operators when the matter of organizing a self-defense league is taken up. Plans are now being made for the operators to organize an association which shall have for its purpose the protection of the coal mining industry of the state.

**Charleston, W. Va.**—State officials estimate that nearly $200,000 will be paid out of the workmen's compensation fund to the families of the men who lost their lives at the Layland mine of the New River and Pocahontas Consolidated Coal Co., where a recent explosion occurred. The widows of the men lost will receive $20 per month with $5 per month for each child under 15 years of age.

**West Middletown, Penn.**—It was recently learned that John A. Bell of Carnegie has renewed the options on 5000 acres of coal in the eastern part of Hopewell Township in the vicinity of Buffalo Village. The renewals are for 6 months, and it is generally believed throughout the district that the coal will be sold before the expiration of that time. The majority of the options are at $100 per acre while some are at $150 per acre.

**Point Pleasant, W. Va.**—Harold W. Poysell and Edwin Marmet, receivers of the Marmet Coal Co., recently filed a report for the year ending Feb. 1, 1915, showing that the business made a profit during only four months of the year. These four months showed a profit of $14,558.98 while the remaining 8 months footed up a total loss of $28,593.74, leaving a net loss of $14,034.75.

**Washington, D. C.**—A complaint against the rate on coke from the Connellsville region to the Buffalo district in New York, was recently filed with the Interstate Commerce Commission by the Buffalo Union Furnace Co. and the Wickwire Steel Co., in which it is stated that the rate on coke from the Connellsville district to the Buffalo territory is $1.85 per ton, whereas the rate on coal from the same origin to the same destination is but $1.40 per ton.

# Coal Trade Reviews

## General Review

**Anthracite shipments show a heavy decline. Outlook for April business rather unfavorable. Bituminous buyers forcing concessions on new contracts. Negotiations progressing slowly. Pessimistic outlook for the Lake trade.**

Tangible evidence of the extremely adverse conditions prevailing in the anthracite market is seen in the current statement of shipments for the first two months of the year, which are the lightest in the modern history of the anthracite trade. This situation was fully anticipated, however, since all the collieries have been curtailing to a greater or less extent during this period—a most unusual condition in the mid-winter season. The low temperatures and storms at the beginning of the current week arrived too late to stimulate any important buying, and the agencies are now turning their attention to the outlook for April business. These minimum prices of the year invariably create a rush of orders, but this season finds the consumers less interested than usual, and conservative observers are beginning to anticipate a light month.

The bituminous agencies are still concentrating their entire attention on new contracts, the situation on which is generally unsatisfactory. Business is being closed with the greatest difficulty, and keen competition of the most aggressive kind is forcing the producers to make substantial concessions on old figures in many instances. In addition to this, the amount of business being closed is falling substantially behind previous records. The offshore movement from Hampton Roads has increased, but the accumulations continue large there, as well as at other Tidewater points, though prices are fairly well maintained, principally for the reason that there is little to be gained by cutting. Persistent rumors of a break in Coastwise freights was one of the features of the week.

The warm weather, the extreme conservatism on the part of the retail dealers, and a relapse in the manufacturing and industrial demands from which so much has been expected, has created a distinctly adverse sentiment in the Pittsburgh district. Bids are exceedingly low on what few contracts come up, operators appreciating that this will be necessary to land the business. Lake shippers are still showing little or no interest in purchases, while the market is glutted with even more coal than during the past several weeks, and prices are softer.

Ohio dealers are busily engaged in cleaning up stocks and manufacturing is not showing any increase, so that the demand is light in every direction. It is clear that the opening of the Lake trade will be slow. The Southern markets are heavily over-stocked, while the mines are running at half capacity, and some are even closed down entirely.

Summer conditions prevail in the Middle Western market, with prices at unprecedented low levels. On new contracts buyers are deferring definite action, and using every means to force concessions on last year's figures. Requisitions on current contracts have been restricted to the lowest minimum specified, and there are still large tonnages of consignment coal on track with more en route. The labor officials complain that there are more idle men than for a number of years.

## ATLANTIC SEABOARD

### BOSTON

**What interest there is in Hampton Roads coals is confined to the freight market. Georges Creek shippers begin to enter market for season business. Anthracite orders accumulating for April delivery.**

**Bituminous**—The market shows a very sluggish tone. On Hampton Roads coals there is very little doing; prices are more or less soft, and the outlook disappointing. The dullness has spread to water freights and there are persistent rumors that recent charters have been made at lower figures. This makes the buyers who have stayed out of the market all the more resolved to wait developments, and 5@10c. concessions no longer interest them. Most of the contracts already closed include a rather generous protection clause and at present writing it looks as if some of the early prices would have to be revised.

Meanwhile Pocahontas and New River are in heavy supply at the Virginia piers and occasionally low prices are made to free cars. At distributing points here stocks are still large and inquiry very light. Receipts here are mostly for contract application, only a fortnight or so remaining now for coal on the 1914 basis.

There are signs of the Georges Creek interests entering the market now for season business with delivered prices on a competitive basis. In a good many quarters buyers are partial to this coal, but it seems almost inevitable that this year its tonnage here will be materially reduced.

Shippers of the better grades from Pennsylvania continue active in this market but nothing significant as to tonnage can be reported. The prospect for a larger volume of these coals in New England is very much involved with the situation on water freights. If the latter are high it means a larger opening all-rail and by reason of the difference in price f.o.b. a more favorable prospect at tide-water.

**Water freights** are believed to be on the point of weakening; that is, for current charters. The $1 rate that has been held very firmly for several weeks has receded to 90c., Hampton Roads to Boston, and there are rumors, not yet confirmed, that an even lower rate has been named. The fact is, orders are so scarce that owners of coastwise transportation, barges in particular, are unable to place their tonnage.

**Anthracite**—The weather continues so mild that there is no current business. The only present interest is in April delivery at the anticipated 50c. reduction in the circular. These prices have been discounted by individual shippers for several weeks but New England buyers have heard rather less of such offers than if outside freights had been lower.

Current quotations on bituminous at wholesale are about as follows:

| | Clearfields | Cambrias Somersets | Georges Creek | Pocahontas New River |
|---|---|---|---|---|
| Mines* | $0.90@1.40 | $1.15@1.60 | $1.67@1.77 | |
| Philadelphia* | 2.15@2.65 | 2.40@2.85 | 2.92@3.02 | |
| New York* | 2.45@2.95 | 2.70@3.15 | 3.22@3.32 | |
| Baltimore* | ..... | ..... | 2.85@2.95 | |
| Hampton Roads* | ..... | ..... | ..... | $2.70@2.80 |
| Boston† | ..... | ..... | ..... | 3.70@3.90 |
| Providence† | ..... | ..... | ..... | 3.58@3.73 |

* F.o.b. †On cars.

### NEW YORK

**Buyers are forcing concessions on old contracts. Anthracite down to an irreducible minimum. Fuil April circulars prevail generally.**

**Bituminous**—The salient feature of the bituminous market continues to be the extremely sharp competition on new contracts which is having the expected result of forcing concessions on last year's figures in many instances. This applies more particularly to those contracts where moderate advances were made last year; the reductions are back to the former level in most instances, but the agencies are meeting these figures only as a last resort, since they quite frequently mean the elimination of practically all their profit.

The spot market continues in a rut and prices are very uncertain. The supplies at Tidewater continue excessive and there is considerable coal reported on demurrage at different times which is accentuating the difficulties of the situation and causing a wide fluctuation in quotations. The bunkering trade so far for the current month has been somewhat above the average. We continue prices on the same basis as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70 @2.80; best Miller Pennsylvania, $3.10@3.15 Georges Creek, $3.15@3.25.

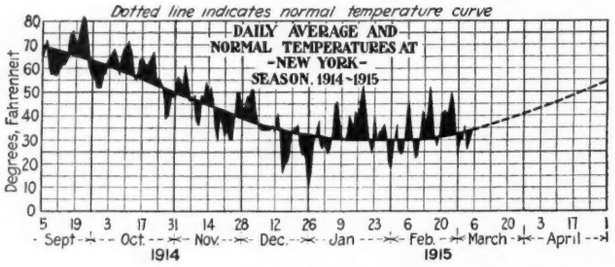
**Anthracite**—The local anthracite market has seldom, if ever, been so completely flat. The customary season's end slowing up characteristic of March, has been doubly accentuated this season by the exceedingly poor business throughout the year, and the unfavorable outlook over the future. The individuals are making no pretense of obtaining anything above the April circular, with the possible exception of egg coal, on which the very best qualities command a very slight advance on the Apr. 1 schedule. Stove coal is impossible to move except when a certain proportion of egg is offered as an

inducement. Pea coal is very slow. A shortage of the steam grades is developing as would only be expected under the heavily curtailed mining operations.

Working schedules have seldom ever been so severely restricted; the Delaware & Hudson have closed down for a straight week, while the Delaware, Lackawanna & Western and the Jersey Central will work only three days and the Lehigh Valley two days. The Reading Co. worked only three days last week.

We quote the New York market on the following basis:

| | Upper Ports | | Lower Ports | |
|---|---|---|---|---|
| | Circular | Individual | Circular | Individual |
| Broken | $5.10 | $4.60@5.10 | $5.05 | $4.55@5.05 |
| Egg | 5.35 | 4.85@5.35 | 5.30 | 4.80@5.30 |
| Stove | 5.35 | 4.85@5.35 | 5.30 | 4.80@5.30 |
| Chestnut | 5.60 | 5.10@5.60 | 5.55 | 5.05@5.55 |
| Pea | 3.55 | 3.40@3.55 | 3.50 | 3.30@3.50 |
| Buckwheat | 2.80 | 2.60@2.80 | 2.50@2.75 | 2.35@2.75 |
| Rice | 2.30 | 2.20@2.30 | 2.00@2.25 | 1.90@2.25 |
| Barley | 1.80 | 1.70@1.80 | 1.75 | 1.30@1.75 |




### BUFFALO

**Slight stir in bituminous, which seems likely to continue. Prices will remain low, as indicated by the bids for spring contracts. Consumers curtailing purchases to the minimum. Anthracite very quiet.**

**Bituminous**—There is some increase in demand, but nothing to compare with what there should be at this time of the year, when so many contracts are to be made. Bidding is low, as otherwise there is little chance of getting the business. Competition apparently is not likely to be very sharp, as the chance of getting contracts depends so entirely on low bidding that many prefer to stay out entirely, in the hope that there will be small contracts and general orders enough to keep them going. It has often happened that when a spurt did come a great many operators and jobbers were without surplus and had to turn everything in on contracts, which had been taken at low prices.

There is some coal on track and some consumers are buying all their coal in this way, entirely at their own prices. Indications point to another season of prices made practically by the consumer. The mines still run at a slow rate and their capacity is so much greater than even a normal consumption, that any increase of demand would be quickly absorbed.

Pittsburgh operators have not signified that they will make a Buffalo price for spring and it may be that they will not do so at all, which leaves prices as per unofficial circular on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley sizes about 25c. lower than Pittsburgh.

**Anthracite**—The demand is very light. Independent anthracite operators have been selling at April prices and even at such a reduction have not been able to stimulate much demand. March is always a slow selling month, however, unless it happens to be unusually cold, which has not been the case so far.

The mines are running about as slow as they ever do and still there is a surplus; some shippers report that two or three days a week is a good average with them. Both stove and chestnut are in excess of the demand but oddly enough there seems to be no more egg than is needed, though it was very plentiful last fall. There is now about 175,000 tons of anthracite afloat here, a third company having taken some tonnage. Vessels are scarce, though they will usually take coal cargoes as fast as they discharge their winter grain.

### PHILADELPHIA

**Snow fall early in week had little effect in increasing the anthracite demand. Steam sizes the only active department. Better inquiry in bituminous, but little business showing as yet.**

**Anthracite**—Contrary to expectations, the snow storm late last week caused little or no increase in the anthracite demand. It is comparatively easy at the present time to fill up incomplete stocks with April-price coal, and interests maintaining the maximum circular, find themselves hard pressed to dispose of their heavily curtailed output. Even with the inducement of the low prices, dealers hesitate to take on additional supplies.

April offerings appear to be the rule rather than the exception among the individuals; pea coal sells as low as $2.10 at the mines, which is a flat concession of from 40 to 50c. from the circular. Steam sizes seem to be in fair demand, and the market is absorbing the curtailed production. Contracting on the broken and steam sizes has about been completed, and the prices realized compare favorably with last year, during the previous coal season, namely, $3.35 for broken, $2.35 for pea, $1.30 for buckwheat, and 90c. for rice.

Predictions as to the outlook for April and May are varied. While it is undoubtedly true that the dealers are well stocked, those still desiring to take on coal at the low prices will probably cause a demand which will be difficult to fill; most dealers feel that they should receive shipments on all the orders they place for April consignment. But there has never been a period when there was such an apparent lack of interest in April business.

Prices ruling at Tidewater are about as follows:

| | Circular | Individuals |
|---|---|---|
| Broken | $4.75 | $4.50 |
| Egg | 5.00 | 4.60@4.70 |
| Stove | 5.00 | 4.90@5.00 |
| Chestnut | 5.25 | 4.90@5.00 |

**Bituminous**—There seems to be a slightly better feeling in the trade, due to the fact that there appears to be a little more business in the market.

### HAMPTON ROADS

**Export shipments for the week show up well. Dumpings for month of February 880,075 tons. Still an excessive supply in the yards.**

Dumpings over the Hampton Roads piers for the week have shown up satisfactorily under existing conditions. The export cargoes have gone forward by both schooner and steam vessels and there has probably been the largest number of schooners sailing from Hampton Roads during the week just closed, in the history of the port; it is also understood that several others are now in port loading and due to clear in the next few days. Some little coal has been taken by the government and the coastwise movement has been fair.

The railroad yards still have more than the normal supply of coal on hand but this has in no way affected prices as cutting does not seem to increase the demand for tidewater coal, especially on export business.

During the month of February just ended a total of 880,073 tons of coal was dumped over the Hampton Roads piers. While these figures show a decrease of 5460 tons below those of January, it is really an increase over January shipments as the former month had 31 days while February had but 28 days. During February the Norfolk & Western dumped 383,672 tons from Lamberts Point, the Chesapeake & Ohio 260,472 tons from Newport News and the Virginian Ry. 235,929 tons from Sewalls Point.

A total of 141 vessels, foreign and American, cleared for foreign ports and 14 of the American vessels were schooners.

The following cargoes cleared from Norfolk and Newport News, between Feb. 27 and Mar. 5, inclusive:

| Norfolk | | | Newport News | | |
|---|---|---|---|---|---|
| Vessel | Tons | Destination | Vessel | Tons | Destination |
| **Copenhagen** | 2203 | Salaverry | **Neugus** | 3887 | Port au Spain |
| **Chiswick** | 4500 | Canal Zone | **Anna** | 1643 | Santiago |
| **Franklyn** | 7400 | Genoa, Italy | Chas. Whittmore | 1109 | Cienfuegos |
| Margaret Haskell | 3260 | Montevideo | Edith | 1791 | Cienfuegos |
| **Berwindvale** | 7901 | Havana, Cuba | Margaret | 1993 | Cienfuegos |
| Singleton Palmer | 4072 | Rio | Matanzas | 1525 | Cadiz, Spain |
| Marcus L. Uran | 2720 | Rio | | | |
| Mary E. Palmer | 1895 | Rio | | | |
| **Naugarland** | 6550 | Genoa, Italy | | | |
| Addison E. Bullard | 2500 | Montevideo | | | |
| **Hermod** | 4500 | Curacao | | | |
| **Beckenham** | 6100 | Canal Zone | | | |
| Nellie W. Craig | 709 | Bermuda | | | |

Note—Steamers are indicated by **bold face type**, all others being schooners.

### BALTIMORE

**Snow and sleet storm impedes traffic and movement was light. Outlook on contracts not favorable.**

Export fuel and sample lots for contract tests have been delayed by the recent storms but not seriously as there was enough coal at Tide to meet the requirements generally. Contracting absorbs the attention of the bituminous trade. It seems likely from present outlook that the business closed by the middle of April will be less than last year. Prices remain about the same. West Virginia gas three-quarter is selling around 85 to 90c., with steam coal of low grade around 80 to 85c. and best fuels at $1.25. Pennsylvania lower grade coals sell at from 90c. to $1, and best fuels at from $1.25 to $1.35.

### OCEAN FREIGHTS

**Market continues to advance. Sugar freights to West Indies steady up.**

There was a further advance in the freight market last week, owing to the continued demand for steamers for grain cargoes. Prompt boats are practically unobtainable. The British St. "Nora," about 5000 tons cargo, was chartered in London to load coal from Range to Montevideo at $9.60. A number of sailing vessels were chartered last week to Rio at $6 and $6.50; and also a vessel to the River Plate at about $7.25, free discharge. On above charters all foreign port charges are for the account of the charterers. There is a lull in sugar freights, and should same continue, it might be possible to shade the rates to West Indies quoted below:

| To | Rate | To | Rate |
|---|---|---|---|
| Havana | $3.00 | Guantanamo | $3.75 |
| Cardenas or Sagua | 3.75 | Demerara | 5.50@ 6.00 |
| Cienfuegos | 3.50 | Bermuda | 3.75@ 4.25 |
| Port of Spain, Trinidad | 3.50 | Vera Cruz | 3.50 |
| St. Lucia | 3.50 | Tampico | 3.50 |
| St. Thomas | 3.50 | Rio | 10.20 |
| Barbados | 3.50 | Montevideo, Buenos Aires or La Plata | 9.60 |
| Kingston | 3.50@4.00 | Mediterranean | 9.60@12.00 |
| Curacao | 3.25 | Valparaiso | 8.40 |
| Santiago | 3.75 | | |

Note—Rates noted in **bold face** type are only approximate.
W. W. Battie & Co.'s Coal Trade Freight Report.

### OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

| Vessel | Nationality | From | To | Tons | Rate |
|---|---|---|---|---|---|
| (2 foreign steamers) | | Atlantic range | Italy | | $9.60 |
| Baker Palmer | | Baltimore | Boston | 2240 | |
| Helen W. Martin | | Baltimore | Galveston | 2029 | |
| **Sif** | Norwegian | Norfolk | Martinique | 1959 | |
| The Josephine | | Norfolk | Savannah | 563 | |
| **Nora** | British | Atlantic range | Montevideo | 2537 | 9.60 |
| Myrtle Leaf | British | Port Johnston | St. John, N. B. | 336 | 1.35 |
| **Progress III** | Norwegian | Baltimore | Mediterranean | 2224 | |
| Stella (ship) | Norwegian | Baltimore | Rosario | 1818 | 8.00 |
| Dorothy Palmer | | Norfolk | Rio Janeiro | 2315 | 6.00 |
| Chas. A. Campbell | | Norfolk | Rio Janeiro | 1493 | |

Note—Steamers are indicated by **bold face** type, all others being schooners.

## OHIO VALLEY

### PITTSBURGH

**Market has lost strength and is quotable 5c. lower. Contract demand light. Mines operating at 50 to 60% capacity and producing too much coal.**

The Pittsburgh district coal market has lost in strength rather than gained in the past week or two. The domestic demand has been altogether unsatisfactory, on account of relatively warm weather and the extreme conservatism of retail dealers, while the demand from other quarters has experienced no further increase, and this has been a direct disappointment to coal operators, whose expectations were based upon a continuance of the improvement in manufacturers' demand that began two months or more ago. The market is more glutted with coal than at any time for many weeks, and prices are softer than ever.

Contract buyers and Lake shippers are showing no interest whatever. Normally there should be a large volume of contract business under negotiation now, for the twelvemonth beginning Apr. 1, but the activity is far below normal for the time of year, and this despite the fact that such contracts would run through the period just before the biennial wage adjustment, when if ever the market should be strong. It looks as though twelvemonth contracts would be made at close to present prices, with no stiffening due to that influence. There has been hardly any coal bought for the Lake trade and predictions of an improvement now have reference to late in the season. The Pittsburgh district is operating at between 50 and 60% of nominal capacity, and is evidently producing too much coal at that.

Prices quoted in recent reports as being practically nominal are now so generally departed from that we quote about 5c. per ton lower, and even these new prices are very frequently shaded: Slack, 90c.; nut and slack, $1; nut, $1.05; mine-run, $1.10; ¾-in., $1.20; 1¼-in., $1.30, per net ton at mine, Pittsburgh district.

### COLUMBUS

**Dullness characterizes the local coal industry. Domestic trade is dead and the same is true of steam business. Lake trade prospects not bright.**

The coal trade has been quiet to the extreme. There has been little demand for domestic sizes, which coupled with weak steam business makes the tone of the market decidedly bad. There are no immediate hopes for the future until the arrival of the stocking season.

Dealers' stocks are sufficient for present needs and they are not inclined to order additional supplies at present. They are devoting their attention to "cleaning up" in order to avoid being caught with large stocks. The weather has been unfavorable and dealers are no longer looking for any cold spell which might stimulate trade.

Little is doing in steam sizes. Manufacturing is not increasing and as a result fuel requirements are light. Railroad fuel business shows a small increase but not sufficient to stimulate trade. Sales managers have considerable difficulty in renewing steam contracts, and many of them are being closed at low figures. Many steam users are content to buy in the open market. There is no disposition on the part of steam users to accumulate stocks at this time.

Retailers have not been having much business and their trade has been extremely spotty. Retail prices have been shaded to a certain extent and there has been cutting in order to get business. This is especially true of Hocking Valley and West Virginia grades. Pocahontas prices are still fairly well maintained.

Indications are not very bright for the Lake trade. Reports from the docks of the Northwest show that a considerable tonnage will be carried over unless severe weather appears. Since manufacturing is quiet, the usual consumption of coal in the Northwest has not been maintained and it is believed the Lake season will be slow in opening. Chartering of boats is not active. Some Lake coal has been loaded but not as much as usual at this time of the year.

Prices in the Ohio field are:

| | Hocking Valley | Pomeroy | Kanawha |
|---|---|---|---|
| Rescreened lump | $1.45 | $1.50 | ..... |
| Inch and a quarter | 1.30 | 1.35 | $1.30 |
| Three-quarter inch | 1.25 | 1.30 | 1.25 |
| Nut | 1.15 | 1.25 | 1.15 |
| Mine-run | 1.05 | 1.10 | 1.05 |
| Nut, pea and slack | 0.60 | 0.65 | 0.55 |
| Coarse slack | 0.50 | 0.55 | 0.45 |

### TOLEDO

**Upper docks to be cleaned up before fresh supplies are purchased. Opening business will be slow.**

Warm weather has deadened the demand in both the domestic and steam trades. Jobbers are booking some orders but practically everything is for immediate delivery. There is a difference of opinion among local dealers as to the beginning of a real trade in Lake coal. It is generally conceded that navigation will open earlier than usual but it is believed that trade will not open up with any briskness until after June. According to late reports there are now about four and one-half millions of tons of coal on the upper docks which is a million more than was left over last season. There seems to be a disposition on the part of those in charge of the docks to clean up what coal there is on hand before stocking up extensively. The bulk of the shipments will not begin until about the first of July, and may not be very active then.

### TORONTO, CAN.

**Prices unsettled and demand falling off all along the line on domestic grades.**

Trade is fair with a decreasing call for coal for domestic uses. The yards are well stocked in all lines and but little coal is coming forward. Prices for bituminous are rather unsettled, some dealers having made small advances on account of the increased duty while others have made no change. Some lower grade anthracite is retailing at 50c. per ton less than prices quoted which are as follows: Retail anthracite egg, stove, and nut $8; grate $7.75; pea $6.75; bituminous steam $5.25; screenings, $4.25 to $4.50; domestic lump, $6; cannel, $7.50. Wholesale f.o.b. cars three-quarter lump, $3.80; screenings, $2.96.

### CLEVELAND

**Slack has advanced 10c. due to the light receipts. Retail trade not taking much coal and domestic sizes are off.**

Monday night of this week there were not to exceed thirty cars of fine coal on track as compared with a normal supply of 150 cars. The trade took all the available fine coal at an advance of 10c., making the spot price $1.70 to $1.80. On the other hand there was no demand for coarse coal. Many of the mines in Pennsylvania, West Virginia and Ohio only worked from one to three days the week before.

Lake coal will begin to arrive at Lake Erie ports the latter part of this month or early next, but this will not materially increase the amount of slack, as the Lake shipping season does not look very bright and operators do not expect to load much coal early. The Upper Lake stocks continue to drag and shipments are far from normal.

There has been no inquiry recently for Lake vessels and a number of the larger shippers do not expect to close for their Lake business until April.

The retail trade is taking so little coal that prices on domestic sizes are low. Pocahontas lump and egg prices for shipment are less than two dollars at the mines.

**Anthracite**—Hard-coal shipping at Buffalo has started and has increased the demand for boats. The Lackawanna has loaded all but one of the ships it will cargo before the opening of navigation. The Erie has two boats ready for loading within the next few days and the Reading is expected to take some tonnage the next few weeks. The curtailment of Canadian business has proved rather embarrassing to the anthracite shippers and caused a larger inquiry for boats to load coal.

Quotations for shipment are as follows:

| | Pocahontas | Youghiogheny | Berghoh | Fairmont | W. Va. No. 8 |
|---|---|---|---|---|---|
| Lump | $3.05 | ..... | ..... | ..... | ..... |
| Lump, 6 in. | ..... | ..... | $2.30 | ..... | ..... |
| Lump, 1¼ in. | ..... | $2.35 | 2.10 | ..... | ..... |
| Lump, ¾ in. | ..... | 2.20 | 2.00 | $1.90 | $1.90@2.00 |
| Egg | 3.15@3.20 | ..... | ..... | ..... | ..... |
| Egg, 6 in. | ..... | ..... | 1.95 | ..... | ..... |
| Mine run | 2.45@2.50 | 2.10 | 1.90 | 1.80 | 1.75@1.90 |
| Slack | ..... | 1.90 | 1.80 | 1.90 | ..... |

### CINCINNATI

**Contracting is proceeding slowly, consumers demanding lower prices than the trade will give. Prompt business somewhat improved.**

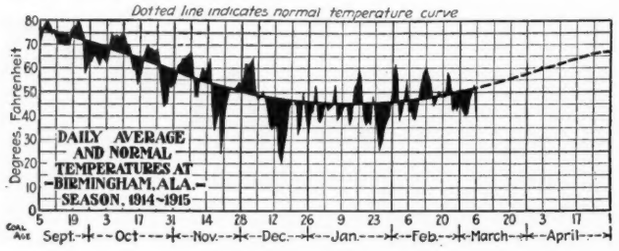
Spring contracting business and the approach of the Lake trade have steadied up the market slightly. Very little actual business is being done just now, however, as buying is naturally on an extremely light basis. Prices on the larger contracts are rather unsettled, and the tendency on the part of consumers is to hold off in view of the present slow state of business and the uncertainty of the future. It is reported that a number of the smaller industrial concerns in this vicinity have closed contracts on the usual basis.

Although a week of generally cold and disagreeable weather has helped the domestic trade, the retailer has not been forced into the market to any extent.

### LOUISVILLE

**Domestic market slightly improved by the colder weather, but the general outlook continues uniformly discouraging.**

Though reports from the eastern part of Kentucky are to the effect that mining operations are being resumed on a more or less general scale, market conditions are not of a character to substantiate this. The domestic market has shown improvement, due to the return of colder weather, but the benefit is confined principally to the retailers. Industrial requirements are said to be somewhat better though prices are unchanged from a week ago. Prices, on block coal are ranging from $1.25 to $1.50, nut and slack, 55 to 70c. and are being maintained with some success, the stiffness of the steam grades being still due to the reduced output, rather than to any increased demand.




### BIRMINGHAM, ALA.

**Coal market very quiet. Demand light and operations much restricted.**

The market on both lump and steam coal continues very quiet, with practically no improvement on either grade. The demand is small, and the mines in this district are running only about two or three days per week, while some are closed down entirely. The spring movement on lump coal has not yet started, but operators are not looking for very heavy bookings for spring and summer shipments, as nearly all of the retail yards are carrying over some stock.

## COKE

### CONNELLSVILLE

**One merchant furnace inquires for coke; otherwise market stagnant. Increased production and shipments on part of steel interests.**

The only new demand for merchant coke is an inquiry from the Perry Iron Co., Erie, for 10,000 to 12,000 tons a month over the second quarter or the balance of the year. The company has been quietly sounding the market for some time and is now out with a definite inquiry, expecting to put the furnace in blast about Apr. 1. The market for spot furnace coke is not well defined as there has been scarcely any buying. While there has been a very considerable increase in coke production in the past two months the increase is practically confined to the steel interests, the demand for merchant coke having experienced scarcely any improvement at all. We quote: Prompt furnace, $1.50@1.55; contract furnace, second quarter, $1.60; to Dec. 1 (nominal), $1.75; prompt foundry, $2@2.50; contract foundry, nominal, $2.20@2.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 27 at 274,935 tons, an increase of 3845 tons, and shipments at 278,461 tons, an increase of 8573 tons.

**Buffalo**—There is no one as yet prepared to champion the coke trade or even predict that it will soon come up to a greater activity. There is a steady sale as a fair number of the local furnaces are running and the demand for their output keeps up about as usual. Prices remain steady on the former basis of $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

**Birmingham**—With several of the furnaces out of blast, many of the coke ovens in the district are idle, and will not be put back into blast until the furnaces resume operations.

**Chicago**—Prices in the coke market show some change. Competition has caused April prices to become general for domestic sizes, and there has been increased absorption at these reduced figures. Furnace and foundry coke remain practically unchanged from last week. Prices are as follows: Byproduct, $4.75@4.95; Connellsville, $4.60@4.80; Wise County 72-hr. (select), $4.50@4.75; gas coke, $4@4.25; furnace, $4.50@4.65.

### THE STEEL INDUSTRY

**Steel Corporation working 67% capacity. Satisfactory increase in tonnage of unfilled orders. Purchases by consuming interests light.**

Negotiations closed in the past week bring the Illinois Central's purchase of open-hearth rails from the Algoma Steel Co.'s mill in Ontario up to 35,000 tons. There are sidelights on this transaction which will not be publicly discussed, but it may yet have its value as an object lesson in the effects of free access to this market for Canadian rails, wire and other products, while on many American steel products going to Canada the duties, already high, have just been increased 7½%. The Algoma rail mill has now booked 60,000 tons of rails on this side and 80,000 tons from the Canadian Pacific. Chicago rail sales of the week include 11,000 tons for the Lake Shore and 9000 tons for a line the Keystone Construction Co. is building in Kansas. The B. & O. placed 7000 tons at Pittsburgh; the Terminal Railway of St. Louis bought 3000 tons and the United Railways of St. Louis 1400 tons. An export order from Colombia calls for 1200 tons.

While buying by manufacturing consumers of iron and steel has been light this month, the expectation is that the present rate of operations will hold through March and there is the hope that spring demand will be a factor by April. The Steel Corporation's steel works are running this week at 67% of ingot capacity. The Homestead plant is not supplied with orders insuring full output for several months, as widely published. Just now 85% of its steel capacity is active, but this is due to special plate orders for pipe work. The Steel Corporation's statement of Mar. 10 showing 96,803 tons gain in unfilled orders last month, against 412,000 tons in January, is favorable in the light of the large inroads made in February by the heaviest mill shipments in months.—"The Iron Age."

## MIDDLE WESTERN

### CHICAGO

**Domestic coals still weak. Screenings buoyant at higher prices. Smokeless coals lifeless. Anthracite soft.**

Screenings have sold as high as $1 per ton this week, showing an average gain of 25c. to 30c. over last week. Otherwise the market is spiritless. The domestic situation is a weather proposition entirely, and there is no encouragement in the outlook. Prices are about as low as could be expected, and operators have been obliged to make unheard of concessions to move coal. The limited lump production has been an important factor in maintaining the screenings market. Contracts are coming to the front, but most buyers are withholding definite action to ascertain if concessions on last year's prices can be obtained.

The Gary steel mills are operating on a minimum scale, and railroad buying continues at the minimum quantities specified in the contracts. Unbilled domestic coal on hand at some mines is so great that shippers find it difficult to meet the demand for the small sizes. The consignment coal on tracks in Chicago is excessive and too much for the market to absorb. As a result, all kinds of coal and grades are being sold at unheard of prices.

Mine run from the Indiana district has been selling below $1 per ton in a number of instances; it is reported that some of the Indiana operators show a disposition to move coal at any price in order to secure funds to meet their payrolls, the mines not even averaging half time. Screenings and steam sizes have been short of the demand, and as a consequence prices have moved up.

Franklin and Williamson County screenings have been much stronger, and the smaller sizes of washed coal have shown betterment. The domestic grades made some improvement earlier in the week, but have again slumped.

Screenings have also been very strong in the Springfield district but the domestic demand is not improved.

There has been some Kentucky consignment coal, particularly egg size, moved at sacrifice prices, and on the whole the demand is of a negligible quantity.

On Hocking the situation is improved, the operators having evidently made up their minds to keep free coal off the market but it may be said that there is no betterment in the situation.

There is still gloom and general demoralization in smokeless sizes. Coal is selling at 30c. to 40c. under list and few contracts, if any, have been let.

Anthracite is very quiet, and some shipments have already been made at April list while there are reports of concessions under the April list in order to secure a tonnage.

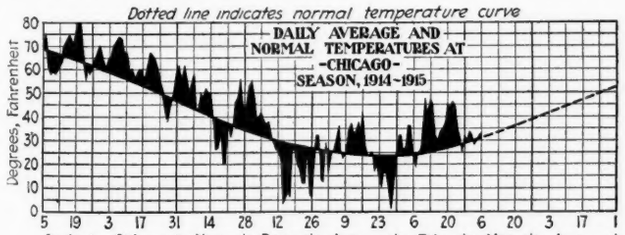
Splint coals are in bad shape, and it is reported there is considerable quantities on track and en route which will have to be sold at ridiculous figures.

Prevailing prices are as follows:

| | Williamson and Franklin Cos. | Springfield | Sullivan | Clinton | Carterville |
|---|---|---|---|---|---|
| Lump | $1.25@1.50 | $1.25@1.40 | $1.35@1.60 | $1.35@1.60 | $1.35@1.75 |
| 4-in. lump | .... | .... | .... | .... | .... |
| Steam lump | .... | .... | .... | 1.10@1.20 | .... |
| 2½-in. lump | .... | .... | 1.25@1.35 | .... | .... |
| 1¼-in. lump | .... | .... | 1.15@1.25 | .... | .... |
| Mine-run | 1.15@1.25 | 1.00@1.05 | 1.00@1.10 | 0.95@1.10 | .... |
| Egg | 1.25@1.50 | 1.15@1.35 | 1.15@1.35 | 1.10@1.30 | .... |
| No.1washed | 1.25@1.50 | .... | .... | .... | 1.25@1.50 |
| No.2washed | 1.15@1.40 | .... | .... | .... | 1.25@1.40 |
| 6x3-in. egg | .... | .... | .... | .... | 1.30@1.65 |
| Nut | .... | 1.15@1.25 | 1.05@1.20 | 1.05@1.20 | .... |
| No. 1 nut | 1.35@1.50 | .... | .... | .... | .... |
| No. 2 nut | 1.25@1.35 | .... | .... | .... | .... |
| Screenings | 0.85@0.90 | 0.75@0.85 | 0.75@0.80 | 0.75@0.80 | 0.85@0.90 |

| | Saline Co. & Harrisburg | E. Kentucky | N. Riv. & Poca. | Somerset | Hocking |
|---|---|---|---|---|---|
| Lump | $1.25@1.50 | $1.25@1.40 | $1.50@1.75 | $1.50@1.90 | .... |
| 1¼-in. lump | 1.15@1.30 | 1.00@1.35 | .... | .... | $1.10@1.50 |
| Mine-run | 1.00@1.10 | .... | 1.05@1.40 | 1.00@1.10 | 1.00@1.25 |
| Egg | 1.25@1.40 | 1.00@1.25 | 1.50@1.75 | 1.40@1.90 | .... |
| No. 1 nut | 1.35@1.50 | .... | .... | .... | .... |
| No. 2 nut | 1.30@1.35 | .... | .... | .... | .... |
| Screenings | 0.75@0.90 | .... | .... | .... | .... |

Knox and Green County 5-in. lump, $1.35@1.50; 3-in. lump, $1.25@1.35; 5-in. egg, $1.15@1.20; 3-in. egg, $1.15@1.20; mine-run, $1@1.10; screenings, 80@85c.




### ST. LOUIS

**Summer conditions prevail and there are no indications of any improvement in sight. Scarcely any demand at all.**

In the Williamson-Franklin County field lump and egg has been quoted as low as $1.10, and nut at 95c. Inability to move these sizes has curtailed the tonnage in the district, and screenings are coming into their own; the latter part of the past week screenings were quoted at 85c., but it was impossible to buy any at that figure. No. 5 washed was quoted at 75 to 80c., though no one has any to sell. There is no indication that conditions will change, unless it might be that the prices on steam coal will advance. The washed market on Nos. 1, 2 and 3 is weak, but on Nos. 4 and 5 it is strong and will continue so.

In the Standard district lump has sold as low as 82½c. and 85c., with a maximum of $1 for 2-in. lump. Screenings have gone to 75c., and indications are that they will continue to advance. There is no domestic demand at all to speak of, and very little steam. No inquiries are received from the country, excepting on the cheapest grades of coal, and this tonnage is remarkably light for this season of the year.

No anthracite is reported moving in, but there is a heavy tonnage of smokeless egg coal at East St. Louis, rejected on account of weather conditions.

### INDIANAPOLIS

**Some slight improvement due to short spell of old-fashioned March weather. Mines making better time. Prices generally unchanged. Domestic coal season about ended.**

There is some improvement in operations at the Indiana mines, due to the colder weather; it appeared as if for a time domestic sales were about over for the season but the mines are now experiencing another little spurt. Operators, however, are not counting on much further business in this direction, as their customers will buy only for current needs from now to the end of the season.

Prices remain generally unchanged, though mine-run ranges from $1 to $1.20; sales are reported even less than $1 but the coal thus offered either comes from some new development, or is of relatively poor quality. Slack prices are stiff, owing to the curtailment in production, due to the restricted call for domestic grades. Mines of the state are probably making a little better than half time. The industrial demand continues to increase slowly and the railroad consumption is not larger than usual.

### KANSAS CITY

**Colder weather stimulates market. Steam grades also active.**

March has begun with a week of cold weather and the retail business holds up well. The wholesale trade has settled down to a summer basis, the steam-coal movement being close to the normal summer consumption just at present. A reduction of domestic tonnage has stimulated the steam-coal market somewhat and steadier prices, ranging about 10c. higher than ten days ago, are the rule. The production in the southern Kansas fields has been about three to four thousand tons in the last fortnight, and has done much toward overcoming the shaky condition of both domestic and steam markets, but especially the steam grades.

Prices are as follows:

| | At Mines | Freight | | At Mines | Freight |
|---|---|---|---|---|---|
| Cherokee lump | $1.85@2.00 | $0.80 | Waverly nut | $1.75 | $0.40 |
| Cherokee mine-run | 1.40@1.60 | 0.80 | Novinger No. 1 lump | 2.00 | 0.60 |
| Cherokee nut | 1.85@2.00 | 0.70 | Novinger coarse | 2.00 | 0.60 |
| Cherokee mill | 1.40@1.50 | 0.70 | Novinger nut | 1.85 | 0.60 |
| Cherokee slack | 1.25@1.35 | 0.70 | Arkansas semi-anthracite | 2.50 | 2.00 |
| Lexington block | 1.90@2.00 | 0.40 | Arkansas sizes | 4.10 | 2.10 |
| Parlor block | 2.10 | 0.40 | Arkansas lump | 3.85 | 2.10 |
| Farmers | 2.00 | 0.40 | Penn. chestnut | 7.10 | 2.50* |
| Richmond | 1.90@2.00 | 0.40 | Penn. egg | 6.85 | 2.50* |
| Waverly lump | 1.85 | 0.40 | Penn. grades | 6.60 | 2.50* |

*To Chicago.

## PRODUCTION AND TRANSPORTATION STATISTICS

### ANTHRACITE SHIPMENTS

Anthracite shipments for February and the first two months of 1914-15 were as follows:

| | February | | 2 Months | |
|---|---|---|---|---|
| | 1915 | 1914 | 1915 | 1914 |
| Phila. & Reading | 693,743 | 746,793 | 1,454,500 | 1,761,919 |
| Lehigh Valley | 887,267 | 681,844 | 1,841,339 | 1,492,432 |
| Cent. R.R. N.J. | 473,928 | 563,650 | 1,082,224 | 1,268,141 |
| Del. Lack. & West. | 630,246 | 573,553 | 1,205,784 | 1,192,491 |
| Del. & Hudson | 544,325 | 442,378 | 1,168,272 | 1,029,271 |
| Pennsylvania | 372,374 | 426,100 | 823,574 | 962,218 |
| Erie | 535,883 | 533,307 | 1,112,890 | 1,239,610 |
| Ont. & Western | 137,341 | 153,826 | 321,059 | 351,101 |
| Total | 4,275,107 | 4,121,451 | 9,009,642 | 9,297,183 |

Stocks at Tidewater Jan. 31 were 798,125 tons as compared with 782,581 tons, Feb. 28.

## FOREIGN MARKETS

The British reports usually printed under this heading have failed to arrive this week, due to the strike of the Liverpool dockmen.

# Financial Department

## Philadelphia & Reading Coal & Iron Co.

President W. J. Richards of this company reported for the fiscal year ended June 30, 1914, as follows:

The total production of anthracite coal from the lands owned, leased and controlled by The Philadelphia & Reading Coal & Iron Co. for the year ended June 30, 1914, was 10,271,669.04 tons, as compared with 12,807,996.06 tons mined during the previous year, a decrease of 2,536,327.02 tons, or 19.8%.

During the year the company mined 8,992,494.04 tons, a decrease of 2,097,248.12 tons, or 18.91%; purchased 218,957.08 tons and sold 8,747,643.19 tons, a decrease of 2,000,959.01 tons, or 18.62%, as compared with the previous year.

The percentage of sizes above pea produced from the mining operations was 59.35% as compared with 59.92% the previous year.

The decrease of receipts from the sale of anthracite as compared with last year was $8,131,818.30, this decrease resulting almost entirely from the fact that we sold 2,000-959.01 tons less in 1914; the decrease in receipts from sale of bituminous and from other sources was $147,262.66, the bituminous sales falling off 31,991.05 tons and $70,915.96, and other sources $76,346.70, making a total decrease in gross receipts of $8,279,080.96 as compared with previous year.

The decrease in expenses, excluding the amount expended for improvements was $5,292,844.31, resulting from the decreased production of 2,097,248.12 tons.

Cost of transportation of coal by rail and water during the year was $7,768,236.60, as compared with $10,093,802.65 for the previous year, owing to the falling off in our sales of 2,000,959.01 tons.

The cost of maintenance and repairs decreased $370,098.95 and the cost of mining decreased $2,049,042.30 as compared with the previous year.

The total sum expended for improvements during the year and charged to expenses was $1,193,385.43, as against $1,241,-070.64 the previous year.

Thirty-one collieries were operated a total of 7313 days during the year ended June 30, 1914, as compared with a total of 8770 days during the previous year. None of the washeries was in operation during the year. The collieries have a capacity in excess of the maximum amount that they may be called on to produce.

The funded indebtedness of the Coal & Iron Co. has been reduced by the following payment: Philadelphia & Reading Collateral Sinking Fund Loan, $30,000. This company has been reimbursed by Reading company for the payment of these bonds; the amount of this loan now outstanding is $1,050,000.

On June 27, 1913, the Commonwealth of Pennsylvania passed an act laying a tax on anthracite coal of 2½% of the value thereof when prepared for market, the law taking effect on June 28, 1913. The tax due by this company for the period from June 28 to Dec. 31, 1913, amounted to about $320,000.

It is with feelings of profound regret that the board records the sudden death on Apr. 26, 1914, of George F. Baer, president of the company.

At a special meeting of the board of directors, held on May 8, 1914, the office of chairman of the board was created, and Edward T. Stotesbury, a member of board, was elected to fill that position.

W. J. Richards, vice-president and general manager, was elected president of the company to fill the vacancy caused by Mr. Baer's death.

INCOME ACCOUNT FOR THE YEAR ENDED JUNE 30, 1914, COMPARED WITH THE YEAR 1913

| Receipts | 1914-1913 Amount | 1913-1912 Amount |
|---|---|---|
| Coal sales (anthracite) | $30,946,264.63 | $39,078,082.93 |
| Coal sales (bituminous) | 1,206,691.66 | 1,277,607.62 |
| Coal rents | 276,157.24 | 302,713.60 |
| House and land rents | 138,975.50 | 135,339.44 |
| Interest and dividends | 108,037.96 | 109,377.15 |
| Miscellaneous | 27,855.08 | 79.942.29 |
| Total receipts | $32,703,982.07 | $40,983,063.03 |
| Expenses | | |
| Mining coal and repairs | $20,627,192.70 | $23,046,333.95 |
| Improvements at collieries, etc | 1,193,385.43 | 1,241,070.64 |
| Coal purchased (anthracite) | 372,467.41 | 1,308,665.45 |
| Coal purchased (bituminous) | 1,118,875.32 | 1,136,729.46 |
| Royalty of leased collieries | 485,614.01 | 601,325.76 |
| Transportation of coal by rail | 6,555,640.50 | 8,758,817.16 |
| Transportation of coal by water | 1,212,596.10 | 1,334,985.49 |
| Handling coal at depots | 406,451.87 | 458,379.15 |
| Taxes on coal lands and improvements | 488,195.49 | 512,300.00 |
| Improvements and repairs of houses | 113,997.89 | 142,435.68 |
| Damages account coal dirt | 655.85 | 3,769.69 |
| All other expenses | 1,120,958.62 | 1,201,568.49 |
| | $33,606,031.19 | $39,746,380.92 |
| Less coal added to stock | 1,840,416.02 | 2,550,236.23 |
| Total expenses | 31,855,615.17 | 37,196,144.69 |
| Profit in operating | 848,366.90 | 3,786,918.34 |
| Fixed charges and taxes | 86,248.18 | 94,649.51 |
| Interest on Reading Company loan | | 2,269,405.15 |
| Interest on Reading Company commercial loan | 46,728.80 | |
| Abandoned storage yard and jig house | | 176,784.37 |
| Additional wages awarded employees on account of sliding-scale percentage | 132,976.98 | 2,647,325.93 |
| Profit | 715,389.92 | 1,139,592.41 |
| Profit of previous years | 2,599,286.55 | 1,459,694.14 |
| Balance to Credit of Profit and Loss Account | 3,314,676.47 | 2,599,286.55 |
| Tonnage— | | |
| Mined (anthracite) | 8,992,494.04 | 11,089,742.16 |
| Purchased (anthracite) | 218,957.08 | 524,574.05 |
| Sold (anthracite) | 8,747,643.19 | 10,748,603.00 |
| On hand (anthracite) | 1,592,421.19 | 1,120,574.06 |

BALANCE SHEET, JUNE 30, 1914

| Capital Accounts | Amount | Capital Accounts | Amount |
|---|---|---|---|
| Coal lands | $48,368,137.77 | P. & R. collateral sink. fund loan | $1,050,000.00 |
| Timber lands | 841,690.64 | Capital stock | 8,000,000.00 |
| New York and Eastern depots | 839,539.70 | Reading Company | 72,472,767.37 |
| Western yards and depots | 1,824,284.15 | Current Liabilities | |
| Miners' and other houses | 553,137.67 | Pay-rolls and vouchers | 1,062,744.29 |
| Real estate and improvements | 417,939.87 | Due for coal purchased | 30,622.90 |
| Storage yards and washeries | 675,107.78 | Due for royalty | 114,621.80 |
| Other real estate | 403,468.59 | Freight and tolls | 17,523.12 |
| Improve. and equip. at coll | 12,959,224.33 | Cos. and individuals | 382,436.59 |
| Stocks, bonds and loans | 9,863,914.75 | Interest due | 120.00 |
| Total | $76,746,445.25 | Interest and taxes accr. | 497,717.94 |
| Current Assets | | Total | $2,105,786.64 |
| Cash on hand | $369,511.18 | Miners' beneficial fund | 31,851.29 |
| Bills receivable | 6,989.69 | P. & R. Rv. Co. Acct | 1,166,188.94 |
| Coal accounts | 3,098,297.27 | Profit and loss to June 30, 1913 | 2,599,286.55 |
| Rent accounts | 51,795.13 | Profit and Loss July 1, 1913, to June 30, 1914 | 715,389.92 |
| Companies and individuals | 980,541.56 | | |
| Coal on hand | 5,401,478.91 | | |
| Supplies and materials on hand | 1,433,010.48 | | |
| Total | $11,341,624.22 | Total | $3,314,676.47 |
| Stocks, bonds and mortgages | 53,201.24 | Total | $88,141,270.71 |
| Total | $88,141,270.71 | | |

Note. For previous annual report of this company see Vol. 4, p. 1002.

## Pittsburgh Coal Co.

The following is a comparative statement of results for the past two years ended Dec. 31:

| | 1914 | 1913 | Inc. | Dec. |
|---|---|---|---|---|
| Net earnings | $4,201,070 | $6,421,703 | ..... | $2,220,633 |
| Res. for dep., etc. | 2,014,316 | 2,839,295 | ..... | 824,979 |
| Interest on bonds | 815,695 | 856,139 | ..... | 40,444 |
| Total deductions | 2,830,011 | 3,695,534 | ..... | 865,523 |
| Surplus | 1,371,058 | 2,726,269 | ..... | 1,355,211 |
| Preferred div. | 1,353,590 | 1,353,590 | ..... | ..... |
| Surplus | 17,469 | 1,372,680 | ..... | 1,355,211 |
| Previous surplus | 10,526,112 | 9,153,433 | $1,372,679 | ..... |
| P. L. surplus | 10,543,581 | 10,526,112 | 17,469 | ..... |

**The O'Gara Coal Co.** has announced that the interest coupons on its bonds, due Mar. 1 of the current year, will be paid on presentation at the office of the company in the Marquette Building, Chicago, Ill.

# Coal Contracts Pending

*It has been found impossible to eradicate all inaccuracies from this department; since its inception 2.5 per cent, of the items listed have been reported as incorrect, in spite of the fact that we are paying a higher average scale of remuneration for this matter than has ever been paid by this, or any other coal journal. In the collection of this information the customary sources of inquiry, such as clipping bureaus, press reports, etc., were rejected because of their unreliability. Only information obtained directly from the source of the proposed business, or a seemingly reliable connection, is accepted, and much of this is drawn through our affiliations with other leading technical journals. In justice to ourselves and our readers, we believe this brief statement to be warranted. It is only through the close cooperation of all concerned that this department can attain a lasting success and be of real benefit to the coal trade. We will, therefore, appreciate any and all information relative to inaccuracies of contracts listed below.*

**No. 97—Baltimore, Md.**—The following are the bidders on this contract (p. 356), which calls for an annual supply of about 240,000 tons of soft coal: Shaw Bros.; Baker Whitley Co.; Castner, Curran & Bullitt; W. H. Bradford; Coale & Co. Address Pur. Agt. & Gen. Mgr. W. P. Coria, Merchants & Miners' Transportation Co., Baltimore, Md.

**No. 131—Rochester, N. Y.**—Bids on this contract (p. 357) which involves 6000 tons of anthracite and 6000 tons of semi-bituminous coal will be opened Mar. 19. Address Secy. J. S. Mullen, Municipal Bldg., Rochester. N. Y.

**No. 133—St. Louis, Mo.**—Bids will be received by the government engineers here until noon, Mar. 15, for furnishing 25,200 tons of coal in barges (p. 357). Address Maj. Clarke S. Smith, Mississippi River Commission, International Life Bldg., St. Louis, Mo.

**No. 137—Ellensburg, Wash.**—The bids on this contract (p. 398) which provides for furnishing steam coal for Kittitas County were as follows: Roslyn Fuel Co. (special steam coal), $3.40, (washed steam coal) $3.60; Carter Transfer Co. (special steam coal), $3.50. Address County Audr. W. G. Damerow, Ellensburg, Wash.

**No. 143—Buffalo, N. Y.**—The lowest bids on this contract (p. 398) were: Bituminous, C. A. & M. Kaiser (Buffalo), mine-run, $2.65; screened nut, $2.60; slack, $2.45; screenings, $2.15; smokeless, $2.70. Anthracite, Connell Anthracite Mining Co., grate, $5.10; egg, $5.30; pea, $4.25. Address Col. Francis G. Ward, Dept. of Public Works, Buffalo, N. Y.

**No. 144—Oswego, N. Y.**—The Board of Education will be in the market during the latter part of March for about 600 tons of anthracite coal in egg, stove, nut and pea sizes (p. 358). Address Chief Clerk, Dept. of Education, City Hall, Oswego, New York.

**No. 183—Shawano, Wis.**—This contract (p. 399) calls for 1500 tons instead of 2000 tons of bituminous coal as previously stated. This business is usually done on a competitive basis, and is awarded on an evaporative test of the coal. Address Paul E. Caprano, City Water & Light Plant, Shawano, Wis.

**No. 192—Rockville Center, N. Y.**—The local city government will be in the market for about 2500 tons of bituminous coal during the latter part of March (p. 399). This business is customarily done at $3.53 per ton. Address Village Clk. George S. Utter, Rockville Center, N. Y.

**No. 211—St. Albans, Vt.**—We are advised by the Central Vermont Co. that they are not at the present time in the market for 190,000 tons of anthracite and bituminous coal, as stated in a previous issue (p. 400). Address Pur. Agt. J. W. Wardlaw, Central Vermont Ry. Co., St. Albans, Vt.

**No. 222—Bayonne, N. J.**—Sealed proposals will be received by the Board of Education until 8 p.m., Mar. 18, for furnishing about 2500 tons of coal, the amount to be made up of 1500 tons, more or less, of egg, stove, or nut coal, and 1000 tons, more or less, of pea coal (p. 446). Address Secy. W. J. Tomlin, Board of Education, Ave. C and 26th St., Bayonne, N. J.

**No. 241—Fall River, Mass.**—The Stafford Mills advises that they are not in the market for coal as noted in a previous issue (p. 447). Address Treas. Charles B. Luther, Stafford Mills, Fall River, Mass.

**No. 255—Taunton, Mass.**—Concerning this contract (p. 447), we have been advised by Reed & Barton that Pur. Agt. L. A. Hodges is no longer connected with this firm. Address E. R. Mitchell, Reed & Barton, Taunton, Mass.

**No. 268—Buffalo, N. Y.**—Sealed proposals will be received until 2 p.m., Mar. 15, for furnishing anthracite and bituminous coal as required by the Police Department and Patrol Boat for the year beginning Apr. 10. Bids are to be accompanied by a certified check for $500 and a bond of not less than $5000 is required (p. 448). Address Board of Police Comrs., Headquarters Bldg., Franklin and Seneca St., Buffalo, New York.

**No. 276—Bennington, Vt.**—The Twin State Gas & Electric Co. advise that they purchase their coal in the local market (p. 448). Address Mgr. E. E. Larabee, Bennington Division-Twin State Gas & Electric Co., Bennington, Vt.

**No. 279—Windsor Locks, Conn.**—The Northern Connecticut Light & Power Co. report that they are not in the market for coal at the present time (p. 448). Address Northern Connecticut Light & Power Co., Windsor Locks, Conn.

**No. 285—Lynchburg, Va.**—The Board of Education will soon be in the market for approximately 800 tons of mine-run coal, the present contract being closed at $3.45 per ton. Address City Clk. J. M. Otey, Board of Education, Lynchburg, Virginia.

**No. 286—Boston, Mass.**—Proposals may be submitted until Mar. 15 for furnishing the New York, New Haven & Hartford R.R. with approximately 15,500 tons of anthracite coal, divided as follows: 9800 tons of stove, 5000 tons of egg, 300 tons of chestnut, 400 tons of broken. Prices should be per gross ton f.o.b. cars at the mine. For further information on this contract refer to Inquiry No. 6044. Address Manager of Purchases and Supplies, N. Y., N. H. & Hartford R.R., Boston, Mass.

**No. 287—Chambersburg, Penn.**—Chambersburg Electric Light Department will be in the market during April for approximately 2000 tons of bituminous "Jerome" coal. The present contract was closed at $2.90 per ton f.o.b., and was awarded on a test basis. Address Supt. J. H. Mowrey, Chambersburg Electric Light Dept., Chambersburg, Penn.

**No. 288—Troy, N. Y.**—The Board of Public Works will contract during April or May for about 1200 tons of egg and stove coal, to be used by the city schools. The present contract was closed at about $6.47 per ton. Address Commissioner of Public Works, Troy, N. Y.

**No. 289—Chicopee, Mass.**—The Board of Education at this place usually contracts in April for about 1000 tons of Lackawanna egg coal, the present contract price being from $6.80 to $7 per ton. Address Committee on Supplies, Chicopee, Mass.

**No. 290—East Orange, N. J.**—The Board of Education will be in the market during April or May for about 1800 gross tons of anthracite coal. Address Secy. Warren A. Clapp, Board of Education, East Orange, N. J.

**No. 291—Guantanamo Bay, Cuba**—Telegraphic bids were received up to noon, Mar. 11, for either transportation of coal or coal and transportation, for delivery at the Naval Station, Guantanamo Bay, Cuba. The quantity required is about 10,000 tons, and delivery is to be made by Apr. 30. A daily discharge rate of 300 tons is guaranteed at Guantanamo Bay. Address Paymaster Gen. of the Navy Samuel McGowan, Bureau of Supplies & Accounts, Navy Department, Washington, D. C.

**No. 292—West Point, N. Y.**—Sealed proposals in triplicate will be received until noon, Apr. 15, for furnishing and delivering charcoal, smithing and gas coal, as required at this post for the fiscal year 1916. Address Depot Quartermaster Maj. E. J. Timberlake, West Point, N. Y.

**No. 293—Boston, Mass.**—Proposals will be received by the Union Freight R.R. Co. for furnishing approximately 1800 gross tons of broken anthracite coal, shipments to be made in carload lots to Boston in equal weekly deliveries for a period of one year beginning Apr. 1. In corresponding with this company refer to Inquiry No. 6040. Address Mgr. H. A. Fabian, Department of Purchases and Supplies, Union Freight R.R. Co., Boston, Mass.

**No. 294—Meriden, Conn.**—Bids were received up to 11 a.m., Mar. 2, for supplying the Connecticut School for Boys with about 1300 tons of coal. Address Supt. Chas. M. Williams, Executive Committee, Connecticut School for Boys, Meriden, Connnecticut.

**No. 295—Danville, Penn.**—Bids will be received until Mar. 20 for furnishing the State Hospital for the Insane with 10,000 tons of No. 1 buckwheat, 500 tons of egg, and 100 tons of chestnut. Deliveries are to be made as ordered at the

hospital coal dump, between Apr. 1, 1915 and Mar. 31, 1916, and the coal must be free from slate and dirt, freshly mined and of the best quality. Address Steward H. B. Schultz, State Hospital for the Insane, Danville, Penn.

**No. 296—Leavenworth, Kan.**—Bids will be received until noon, Mar. 20, for furnishing coal for the county court house, county jail, county hospital, and for the poor of the county. Address County Clk. J. E. Voorhees, County Clerk's Office, Leavenworth, Kan.

**No. 297—Northampton, Mass.**—The Northampton Gas Light Co. will be in the market about Apr. 1 for 3500 tons of gas coal, delivery via N. Y., N. H. & H. R.R. Address Light, Heat & Power Corporation, Boston, Mass.

**No. 298—Clarendon, Ark.**—The Clarendon Electric Light & Ice Co. will be in the market during April for about 2400 tons of pea and slack coal. The approximate cost per ton is $3.50. Address Cont. Agt. J. T. Bateman, Clarendon Electric Light & Ice Co., Clarendon, Ark.

**No. 299—Hartford, Conn.**—The Hartford Machine Screw Co. will be in the market about Apr. 1 for 2500 tons of anthracite and bituminous coal, deliveries via N. Y., N. H. & H. R.R. and C. N. E. R.R. and teams. Address Pur. Agt. H. R. Grant, Hartford Machine Screw Co., Hartford, Conn.

**No. 300—Stoughton, Wis.**—The contract with the Moline Plow Co. for furnishing various sizes of coal for steam purposes will expire on Apr. 1. Address Mandt Wagon Branch of the Moline Plow Co., Stoughton, Wis.

**No. 301—Housatonic, Mass.**—The Monument Mills will be in the market for 2000 tons of bituminous coal about Apr. 1, delivery via N. Y., N. H. & H. R.R. Address H. C. Church, Great Barrington, Mass.

**No. 302—East Moline, Ill.**—The contract with the Union Malleable Iron Co. for from four to eight cars of lump and egg coal per week expires on Apr. 1. Address Purchasing Agent, Union Malleable Iron Co., East Moline, Ill.

**No. 303—New York, N. Y.**—The following are the bids opened on Mar. 5 for furnishing 350 tons of No. 1 buckwheat coal for Bellevue Hospital: Robert Gordon & Son, $3.35; John S. Conabeer, $3.35; M. L. Bird, $3.41; Burns Bros., $3.39; Meyer-Denker-Sinram Co., $3.72; Chas. D. Norton Co., $3.34; S. Trimmer & Son, $3.75; John W. Peale, $3.11; Gavin Rowe, $3.29; Meeker & Co., $3.07. Address Contract Clk. Geo. D. White, Bellevue Hospital, 400 East 29th St., New York, N. Y.

**No. 304—Wilmington, Del.**—Bids were received up to 10:30 a.m., Mar. 1, for supplying the Water Department with approximately 3700 tons of bituminous coal for a period of one year beginning Apr. 1. Address Ch. Engr. Edgar M. Hoopes, Jr., Board of Water Commissioners, Wilmington, Del.

**No. 305—Atlantic, Iowa**—The Municipal Electric Light Works will contract in April for about 4300 tons of Iowa steam coal, the present contract being closed at $2.10 delivered in bin. Address Mgr. T. E. Nichols, Municipal Electric Light Works, Atlantic, Iowa.

**No. 306—Algoma, Wis.**—The City Water & Light plant will be in the market in April for a supply of mine-run Youghiogheny coal. This company consumes approximately 900 tons per year, the present contract price being $3.70 per ton, delivered in bin. Address Supt. J. O. Posson, City Water & Light Plant, Algoma, Wis.

**No. 307—Logansport, Ind.**—The Logansport Electric Light Co. will soon be in the market for about 14,000 tons of 1¼-in. screenings. This plant is located alongside the Vandalia R.R. Address Purchasing Agent, Logansport Electric Light Co., Logansport, Ind.

**No. 308—Waterbury, Conn.**—The Benedict & Burnham Co. will be in the market about Apr. 1 for 22,000 tons of anthracite and bituminous coal, delivery via N. Y., N. H. & H. R.R. Address Benedict & Burnham Co., Waterbury, Conn.

**No. 309—Kalamazoo, Mich.**—The Kalamazoo Corset Co. at this place will be in the market about Apr. 1 for a supply of lump coal for steam purposes. Address Purchasing Agent, Kalamazoo Corset Co., Kalamazoo, Mich.

**No. 310—Griswoldville, Mass.**—The Griswoldville Mfg. Co. will be in the market about Apr. 1 for 3500 to 4000 tons of anthracite and bituminous coal. Address Pur. Agt. J. W. Ballard, Griswoldville Mfg. Co., Griswoldville, Mass.

**No. 311—Chaska, Minn.**—The Municipal Electric Light & Power Plant of this place will be in the market during April for approximately 800 tons of coal. The present contract was closed at $3.35 per ton. Address Mgr. & Supt. E. F. Strong, Municipal Electric Light & Power Plant, Chaska, Minn.

**No. 312—Chicago, Ill.**—Sealed proposals will be received until 11 a.m., Mar. 15, for furnishing and delivering coal for the following departments in various sections of the city. Each division, as listed in the following, is a separate contract, and the deposit required to accompany each bid is given:

| | Department | | | |
|---|---|---|---|---|
| | Fire | Health | Street | Police |
| District No. 1 | $500 | $100 | $100 | $100 |
| District No. 2 | 500 | 100 | 100 | 100 |
| District No. 3 | 600 | 200 | 100 | 100 |
| District No. 4 | 800 | 100 | 100 | 100 |
| District No. 5 | 500 | | 100 | 100 |

PUMPING STATIONS

| | | | |
|---|---|---|---|
| Central Park Ave | $2200 | Chicago Ave | $2000 |
| Sewage pumping stations | 100 | Twenty-second St | 1900 |
| Harrison St | 700 | Sixty-eighth St | 2200 |
| Springfield Ave | 2000 | Rogers Park | 200 |
| Lake View | 2200 | Roseland | 1200 |
| Fourteenth St | 2200 | | |

MISCELLANEOUS

| | |
|---|---|
| City Hall Building | 900 |
| Bureau of Engineering | 100 |
| Bridges and Harbors | 200 |

Address Comr. of Pub. Wks. L. E. McGann, Room 406, City Hall, Chicago, Ill.

**No. 313—Providence, R. I.**—Sealed proposals will be received until Apr. 1 for furnishing anthracite coal required by the Federal Departments of the State of Rhode Island. Deliveries are to be made as specified, and each bid must be accompanied by a certified check for 5% of the bid. Address Chn. William A. Schofield, Board of Control and Supply, Room 18, State House, Providence, R. I.

**No. 314—South Bend, Ind.**—Bids will be received for furnishing the Singer Mfg. Co., Factory No. 3, 10,000 to 15,000 tons of screenings, deliveries to be made in equal amounts throughout the year. Shipments are to be at the rate of 10 to 18 cars per week during the winter and five to six cars during the summer, the contract to go into effect Apr. 1. The coal from the mines in Pike and Sullivan Counties, Ind., or Franklin and Williamson Counties, Ill., is preferred. Address Purchasing Agent, Singer Mfg. Co., South Bend, Ind.

**No. 315—Arlington, Mass.**—The Arlington Gas Light Co. will be in the market about Apr. 1 for about 1500 tons of anthracite and bituminous coal, delivery via water and B. & M. R.R. Address H. L. Ogden, 131 State St., Boston, Mass.

**No. 316—Wyandotte, Mich.**—The Municipal Light & Water Plant will be in the market during April for 5000 tons of West Virginia mine-run coal. Address Supt. A. S. McClenehan, Municipal Light & Water Plant, Wyandotte, Mich.

**No. 317—Putnam, Conn.**—The Morse, Powhattan & Nightingale Mills will be in the market about Apr. 1 for 2000 tons of bituminous coal, delivery all rail via N. Y., N. H. & H. R.R. Address Pur. Agt. Augustus Morse, Morse, Powhattan & Nightingale Mills, Putnam, Conn.

**No. 318—Sullivan, Ind.**—The present contract with the Sullivan Electric Co. for two or three cars of screenings per week will expire on Apr. 1. Address Purchasing Agent, Sullivan Electric Co., Sullivan, Ind.

## CONTRACTS AWARDED

**No. 93—Jersey City, N. J.**—This contract (pp. 356 and 436) has been awarded to Behrens Bros., Paterson Plank Road, Secaucus, N. J., at $4.19 per ton; contract provides for 2500 gross tons of best quality pea coal. Address Clk. of the Bd. John T. Sweeney, Boulevard Commissioners, County Court House, Jersey City, N. J.

**No. 119—New York, N. Y.**—Bids on this contract (p. 357), which provides for furnishing and delivering about 4,000,000 lb. of No. 2 buckwheat coal alongside of dock at the asphalt plant, 90th and 91st St., East River, were as follows: Gavin Rowe, $4080 (awarded contract); William Farrell & Son, $4320; Pattison & Bowns, $4232.14; Chas. D. Norton Co., $4280; John W. Peale, $4380. Address Pres. Marcus M. Marks, 21st floor, Municipal Bldg., New York.

**No. 166—Concord, N. H.**—The Board of Education has awarded this contract for about 1000 tons of anthracite coal (p. 399) to the E. S. Tenney Coal Co. The contract price is $6.80 per ton of small broken coal. Address Secy. Board of Education, Concord, N. H.

**No. 247—Montpelier, Vt.**—This contract (p. 447) which provides for furnishing 2000 tons of gas coal has been awarded to the Pittsburgh Coal Co. Address Capital City Gas Co., Montpelier, Vt.

**No. 256, Ludlow, Vt.**—This contract (p. 447) which provides for furnishing 1000 to 1500 tons of bituminous coal to the Black River Woolen Co. has been closed. No details are available. Address Pur. Agt. George P. Levey, Black River Woolen Co., Ludlow, Vt.

**For the official advertisements of bids wanted see the Contracts to Be Let section on the second page following.**